

KENWOOD
HI/FI STEREO COMPONENTS

SERVICE MANUAL

KD-850

The KD-850 is a fully automatic turntable; all its mechanisms and controls are the same as the KD-650 except for the full automatic mechanism and control. Refer to the service manual and technical data of the KD-650. The automatic mechanism assembly (D40-0461-05) is the same as that of the KD-4100 except for the position guide. For troubleshooting of the automatic mechanism assembly, refer to the service manual of the KD-4100.



**FULL AUTOMATIC QUARTZ PLL DIRECT DRIVE
TURNTABLE**

CONTENTS

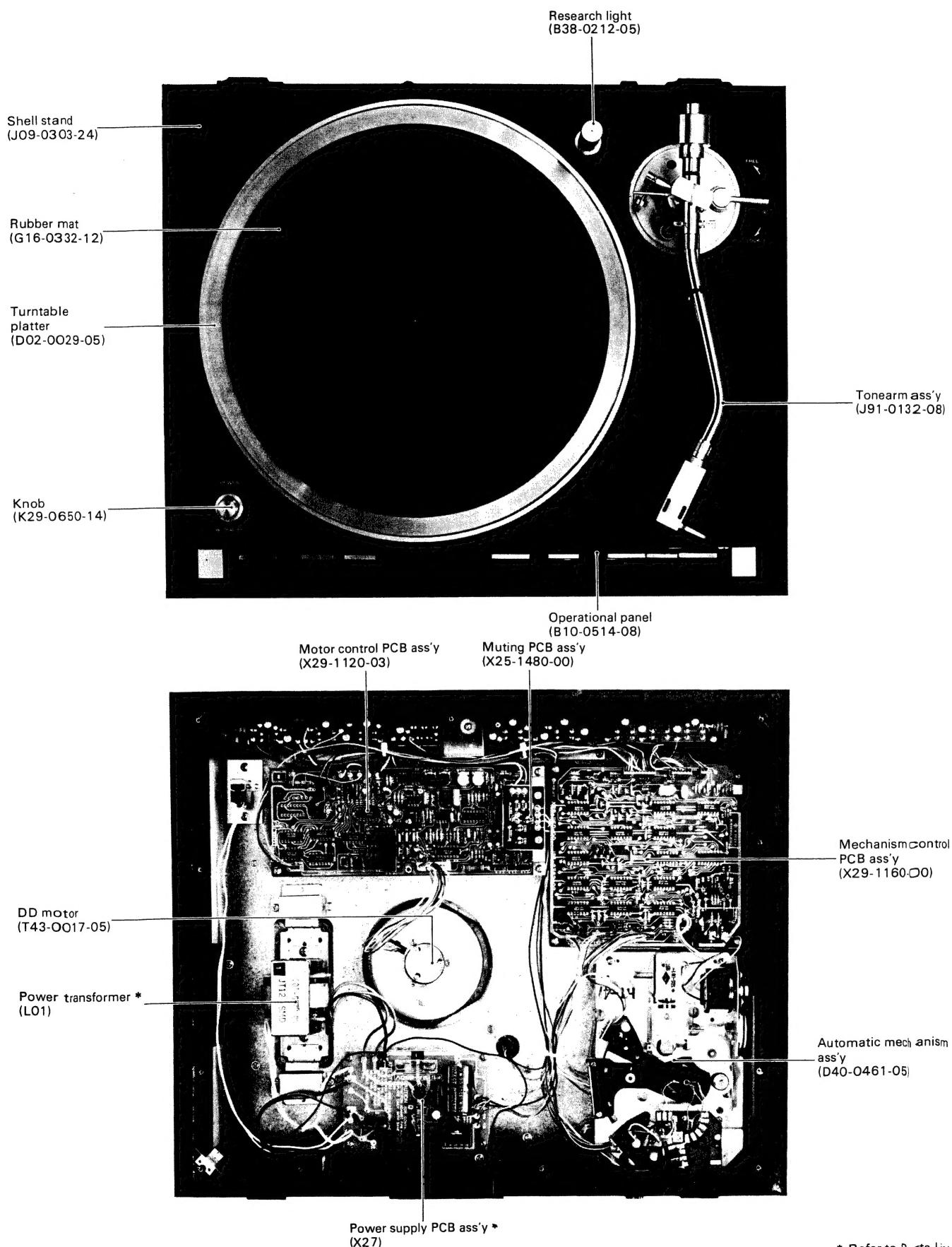
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Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the U.S. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

Region	Code
U.S.A	K
Canada	P
PX	U
Australia	X
Europe	W
England	T
South Africa	S
Other Areas	M
Audio Club	H

EXTERNAL VIEW / INTERNAL VIEW



* Refer to Parts List.

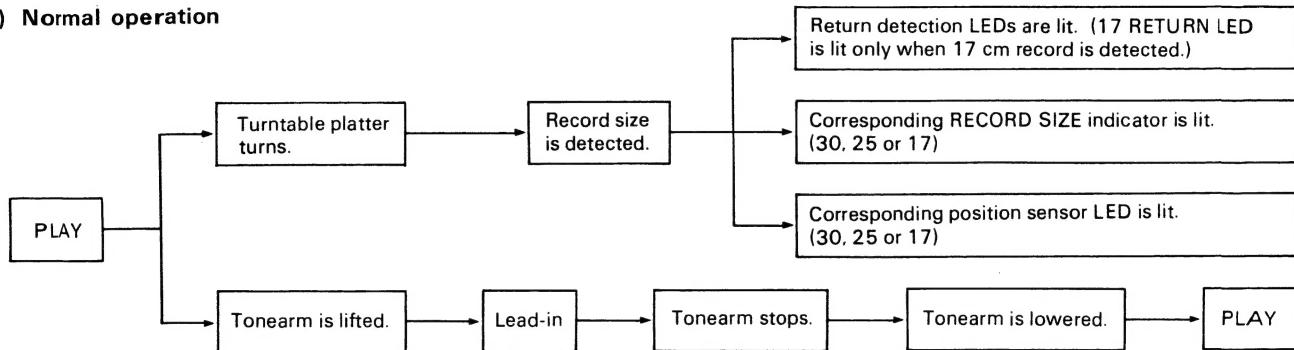
OPERATION PROCEDURES

1. POWER SWITCH ON

- Initial reset → 33 rpm speed indicator is lit.
- Power lamp is lit.
- Research light is lit.

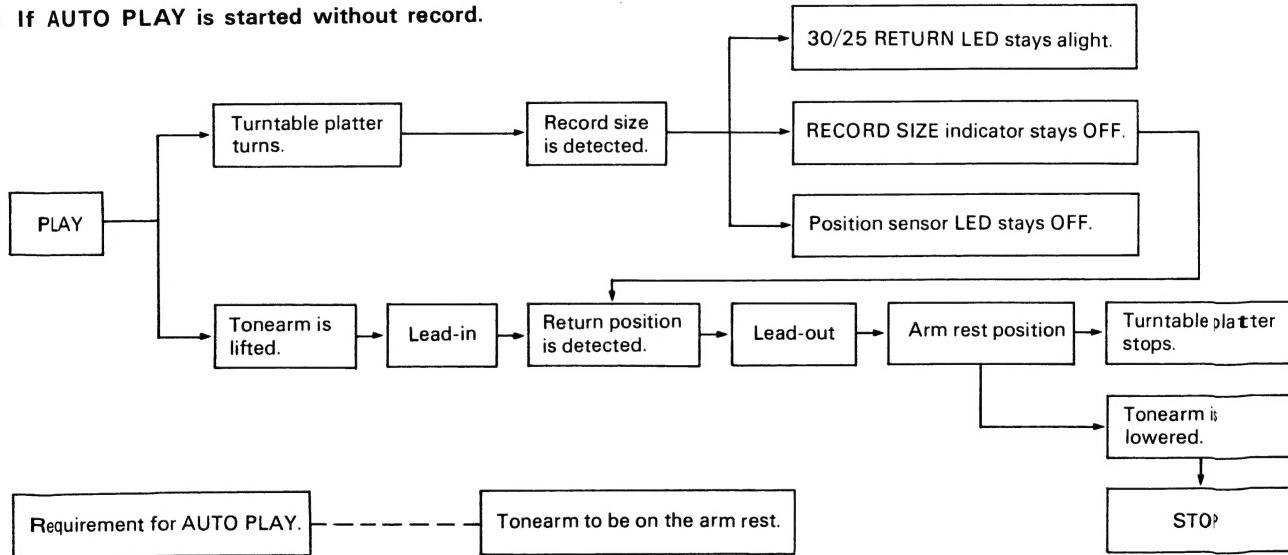
2. AUTO PLAY

A) Normal operation

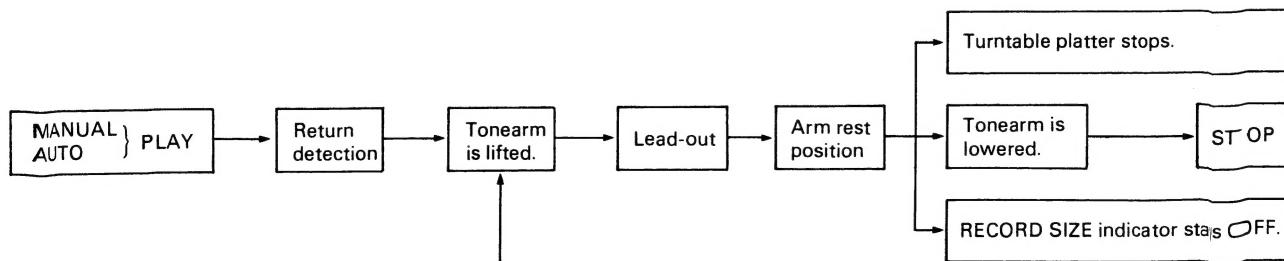


Note: 30/25 RETURN LED is always lit. 17 RETURN LED is lit only when the AUTO SIZE SELECTOR selects 17.

B) If AUTO PLAY is started without record.



3. AUTO RETURN



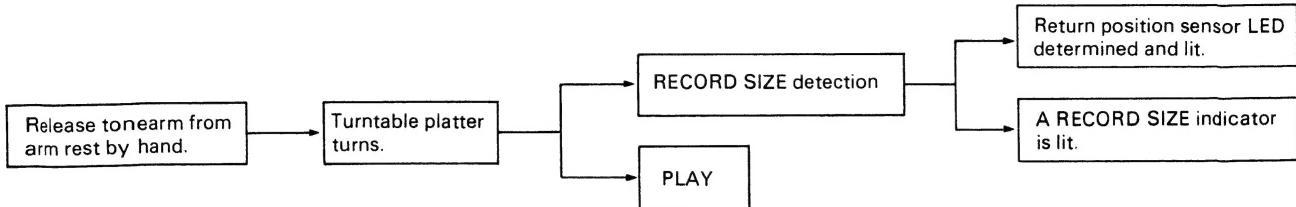
4. AUTO CUT



OPERATION PROCEDURES

5. MANUAL OPERATION

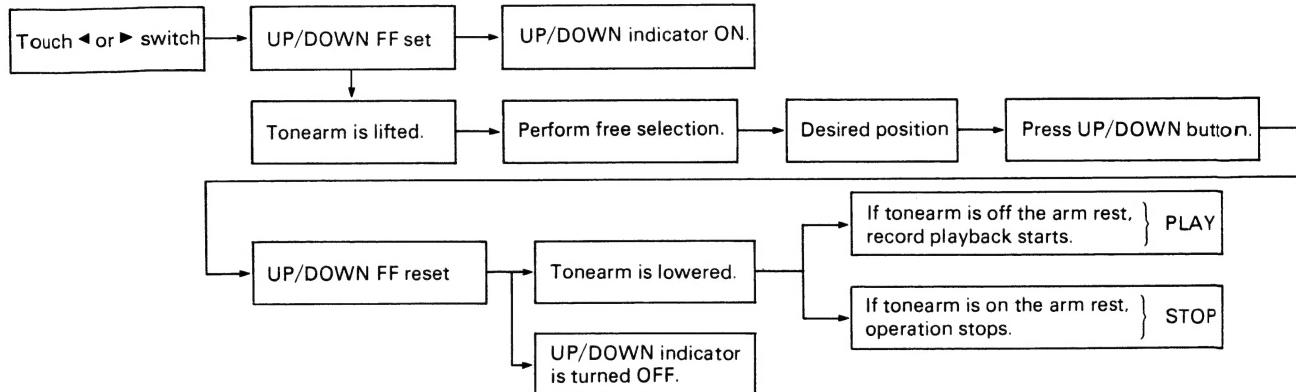
A) Quick MANUAL



B) Free selection

◀FOR→SLOW FORWARD
 FAST
 ▶REV→SLOW REVERSE

FAST FORWARD (Both pressed)
 FAST REVERSE (Both pressed)

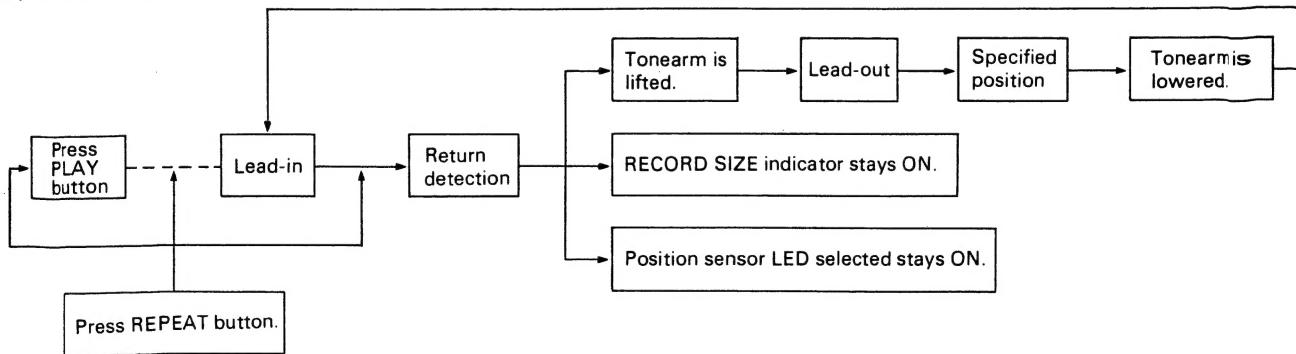


Notes:

1. When the tonearm is on the arm rest, the tonearm drive motor won't be turned ON even if the ▶ switch is turned ON.
2. The tonearm will be returned to the arm rest when RETURN is detected during free selection operation.

6. REPEAT

A) AUTO PLAY

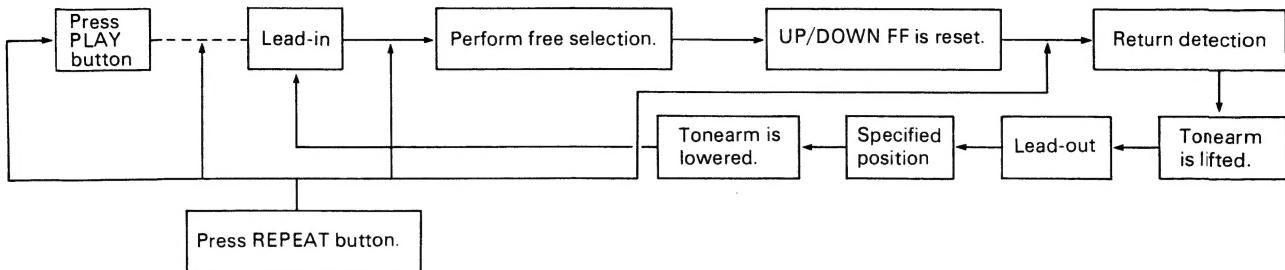


B) MANUAL PLAY

When the tonearm is detached from the arm rest by quick manual or free selection operation, the repeat condition, if it has been set previously, is reset at that point and will not be set.

OPERATION PROCEDURES

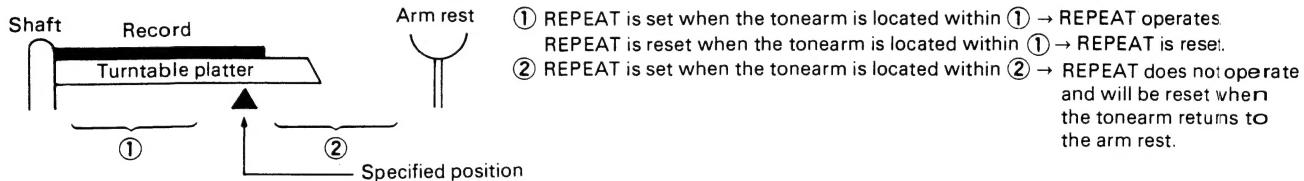
C) When free selection is performed during AUTO PLAY



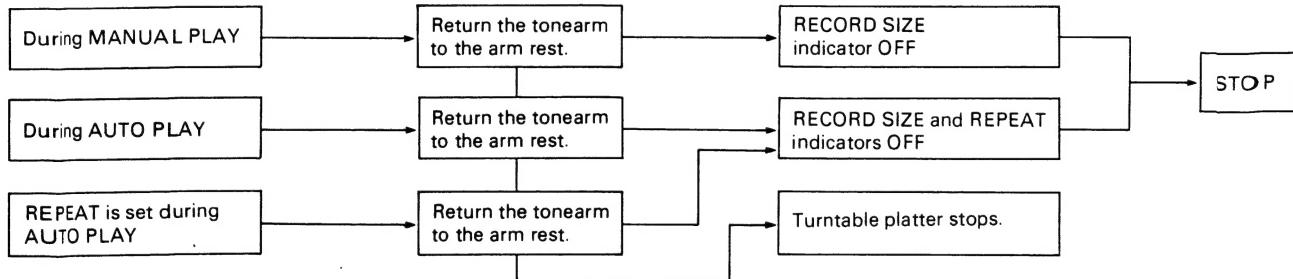
D) REPEAT condition is reset when one of the following occurs.

- REP button is pressed when REPEAT has already been set.
- CUT button is pressed.
- Quick stop operation is performed.

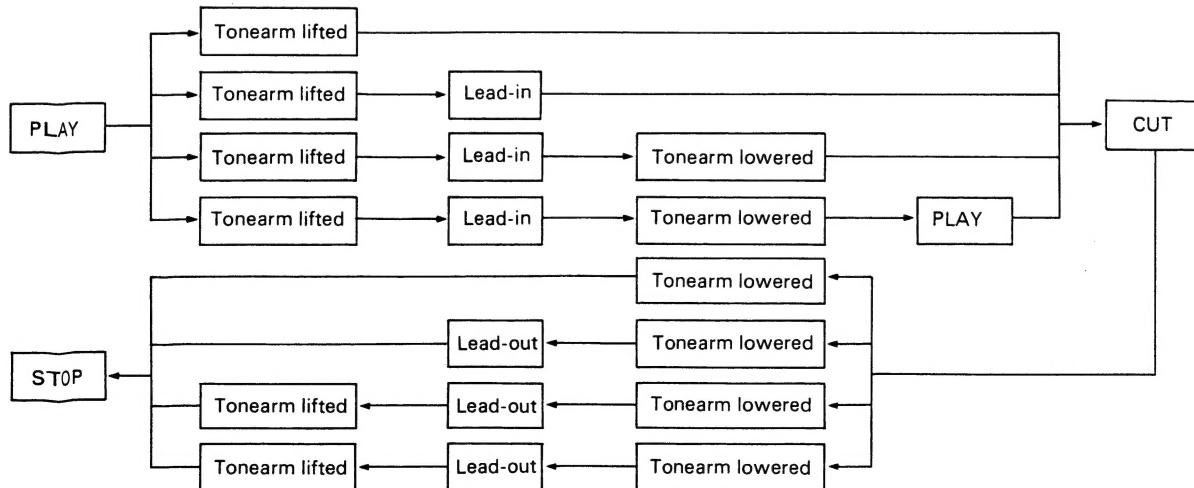
Note: Operation differs according to the tonearm's position as shown below.



7. Quick STOP



8. CUT after AUTO PLAY



RECORD SIZE indicator is turned OFF when the tonearm returns to the arm rest.

OPERATION PROCEDURES

9. UP/DOWN operation

A) Independent UP/DOWN operation + initial reset (DOWN):

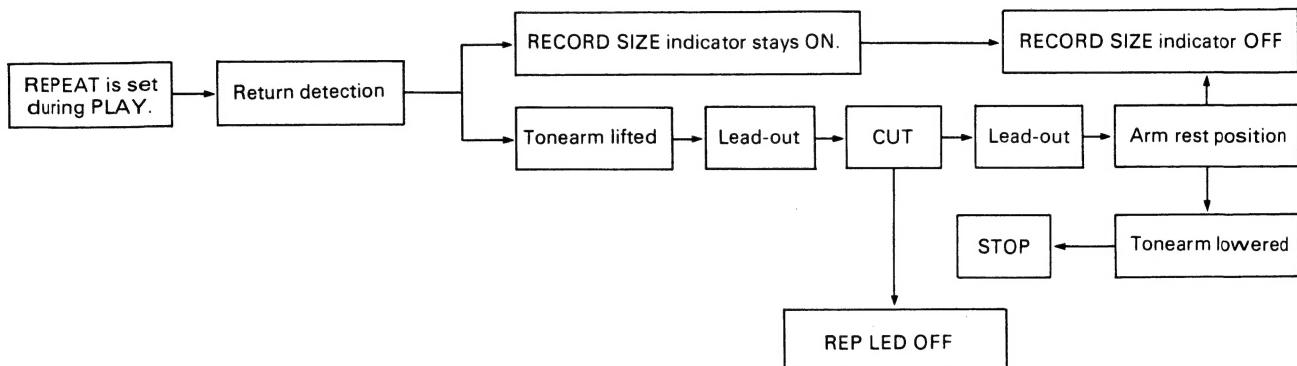
UP/DOWN indicator is lit when the tonearm is lifted up.

B) Free selection:

During free selection, turning ▶ or ▶ ON acts for UP operation and the indicator is lit. DOWN operation is performed by pressing the UP/DOWN button.

10. Operation during returning in REPEAT mode

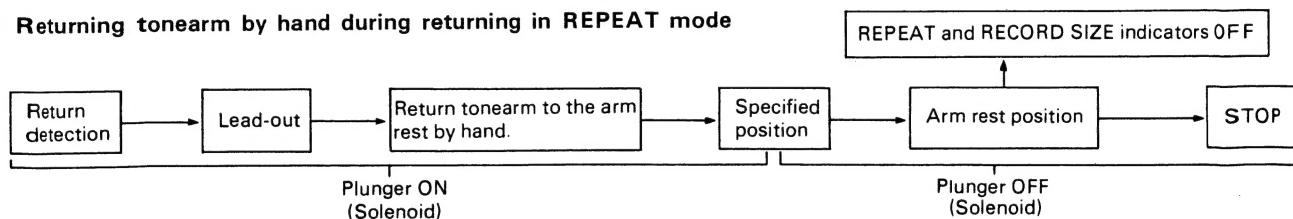
A) CUT operation during lead-out in REPEAT mode



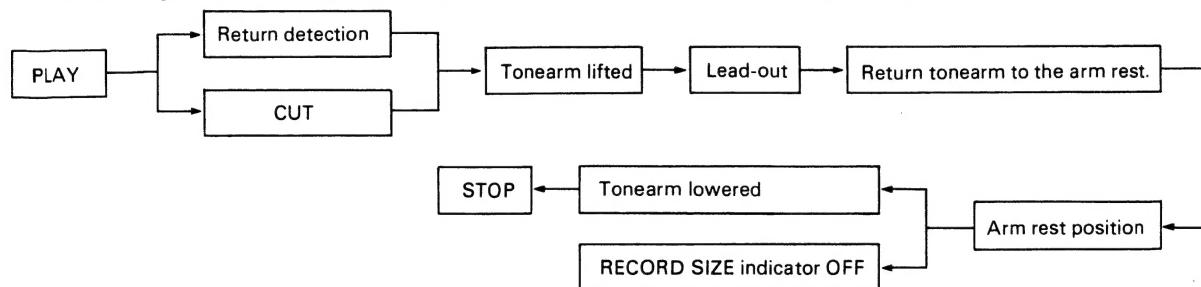
B) REPEAT set/reset operation during returning in REPEAT mode

Refer to the note in Paragraph 6.

C) Returning tonearm by hand during returning in REPEAT mode



11. Returning tonearm by hand during AUTO-RETURN or AUTO-CUT



12. AUTO PLAY during returning in REPEAT mode

Unavailable.

13. Operation when tonearm comes to return position or arm rest position after being started by free selection.

A) When the tonearm comes to the return position

- The tonearm drive motor is turned OFF.
- If the free selection switch is turned OFF, the tonearm will return to the arm rest after lead-out.

B) When the tonearm comes to the arm rest position

- The tonearm drive motor is turned OFF even if the ▶ switch is turned ON. However, it is turned ON if the ▶ switch is turned ON.

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

I. Initialization after power is turned ON

1. Power reset circuit

The power lamps L and R and the research light are turned ON after power is turned ON. All mechanism control (X29-1160-00) circuits are initialized by the power reset circuit. The power reset circuit is shown in Fig. 1 and waveforms at points in the circuit are shown in Fig. 2.

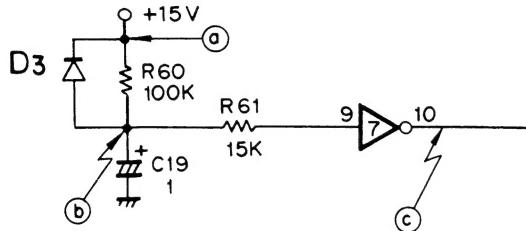


Fig. 1 Power reset circuit

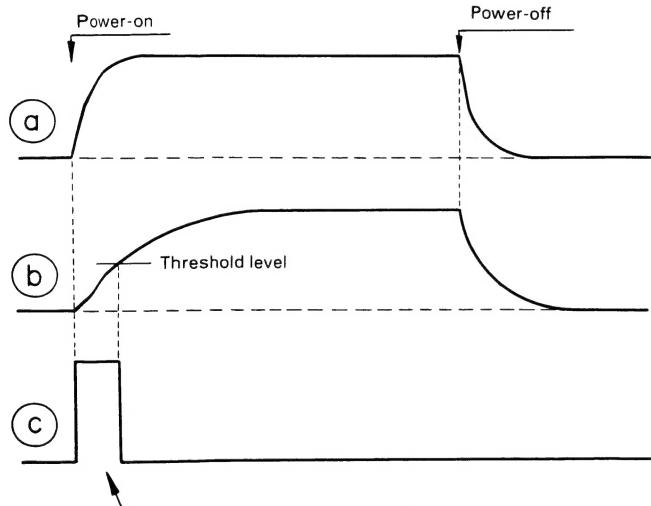
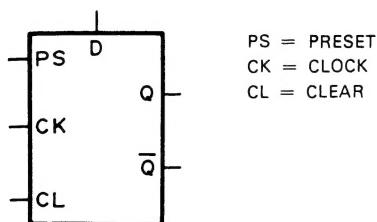


Fig. 2 Waveforms

2. D-FF (Delayed Flip-flop)

Two delayed flip-flops are provided in each IC12 and IC15 of these. Operation of a D-FF is explained in the following.



PS = PRESET
CK = CLOCK
CL = CLEAR

Fig. 3 D-FF

Timing diagram of a D-FF is shown in Fig. 4.

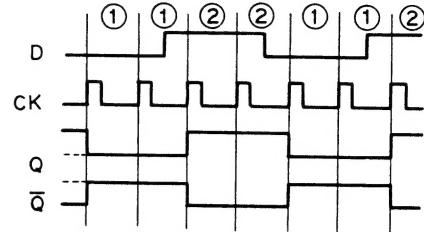


Fig. 4 Timing Diagram of D-FF

When a clock pulse is applied to CK (clock) while D is "H", Q becomes "H" and \bar{Q} becomes "L". When a clock pulse is applied to CK while D is "L", Q becomes "L" and \bar{Q} becomes "H". In other words, the condition of D is output delayed by the time of one clock pulse. The D-FFs used are equipped with PS (preset) and CL (clear) inputs. When PS is set to "H", Q is set to "H" and \bar{Q} is set to "L" regardless of the D input. When CL is set to "H", Q is set to "L" and \bar{Q} to "H" regardless of the D input. CL must be set to "L" to read the CK input. A D-FF can be used as a T-FF by connecting D to \bar{Q} .

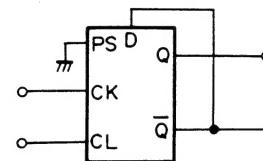


Fig. 5

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

II. Arm rest position, size and return detection circuits (X25-1490-01)

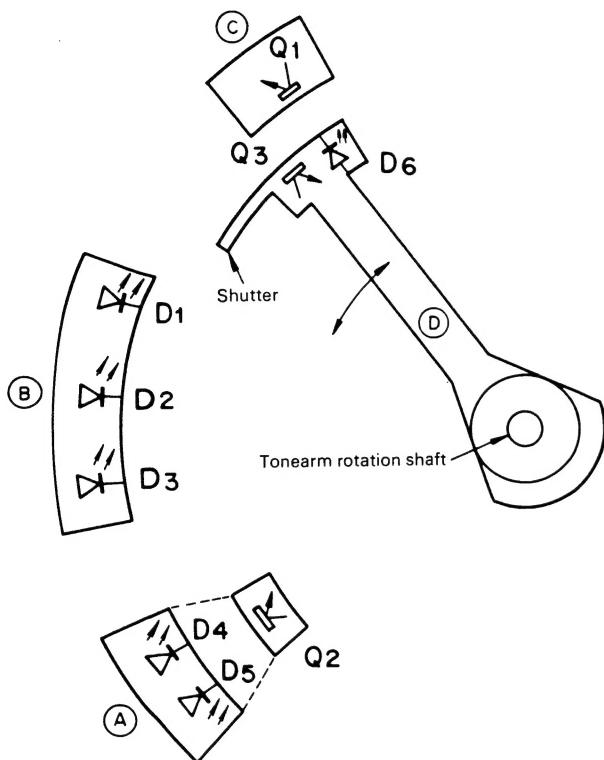


Fig. 1 Detection mechanism (viewed from the bottom)

- Q1: Photo. Tr to detect if the tonearm is at the arm rest.
- Q2: Tonearm return detection Photo. Tr
- Q3: Record size detection Photo. Tr
- D1: 30 cm size LED
- D2: 25 cm size LED
- D3: 17 cm size LED
- D4: 25/30 cm return LED
- D5: 17 cm return LED
- D6: Rest LED
- (A): LED housing for returning point detection
- (B): LED housing for record size detection
- (C): Photo Tr housing to detect if the tonearm is at the arm rest.
- (D): Search arm

1. Appearance of LEDs and phototransistors

Color: white



Fig. 2 LED

Color: Black and white
TPS 605

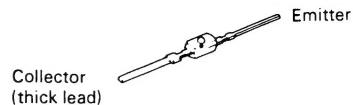


Fig. 3 Phototransistor

If the lens surface is flawed or stained, apparent emitting efficiency may decrease and directivity may vary. As a result, lead-in, arm rest position or lead-out detection timing may differ or they may not be detected at all.

2. Arm rest-position detection
(Refer to Schematic Diagram 3.)

LED D6 in the search arm is always lit. When the tonearm is on the arm rest, the phototransistor Q1 (C of Fig. 1) detects light emitted by D6, so its emitter is at "H" level. The Q1 output signal is used to carry out the automatic playing (explained later) and to stop the tonearm drive motor and turn the plunger OFF when the tonearm returns to the arm rest after play has been completed. (Refer to "Tonearm operation".)

3. Record size detection (1)
(Refer to Schematic Diagrams 1 and 4.)

Phototransistors Q1 ~ Q3 on the PC board X25-1520-00 detect the research light through a prism, which is installed in the turntable platter, when the turntable platter is rotating without a record disk. Light is detected only when the prism passes through the research light, therefore these phototransistors alternate their ON and OFF states. The emitter waveform is shown in Schematic Diagram 4.

① Operation at the time the tonearm is on the arm rest
(refer to Schematic Diagram 1)

IC1-3 is "H" and the inverter output IC7-2 is "L" as shown in Paragraph 2 above. Then, "L" level is applied to IC6-1 2. As one of the AND inputs is "L", IC6-11 is "L" and Q4 is OFF. As the reset input (R) of RS-FF (IC3) is "H" (because the DD motor is not rotating), Q is "L". Both Q5 and Q6 are OFF because they are driven by the AND gate output. Therefore, record size detection is not performed.

② Operation when PLAY switch is turned ON with a 30 cm record on the turntable platter

When a 30 cm record is on the turntable platter, the phototransistors can not detect the research light, thus Q1 through Q3 are all OFF. Therefore, the set input (S) is "L". The reset input (R) is "H" since the DD motor is OFF. As a result, all RS-FFs shown in Schematic Diagram 4 are in the reset condition, that is, Q is "L" and \bar{Q} is "H".

When the PLAY switch is turned ON, the DD motor starts stable rotation, then the reset inputs are turned to "L". However, no "H" signal is applied to the set inputs, so RS-FFs are kept in the reset condition.

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

IC6-13 is "H", and IC6-12 is "H" unless the tonearm is on the arm rest, so IC6-11 is "H" and Q4 is ON. Thus, the record size indicating LED "30D" is lit. At this time, since IC13-3 is "H", Q7 is ON and the 30 cm size LED D1 (in (B) of Fig. 1) is lit.

Its light is detected by phototransistor Q3 in the search arm.

③ Operation when PLAY switch is turned ON with a 25 cm record on the turntable platter

The middle and inside phototransistors cannot detect the research light, thus Q2 and Q3 are OFF. The set inputs of the lower two flip-flops shown in Schematic Diagram 4 are "L". In these flip-flops, Q is "L" and \bar{Q} is "H" after the PLAY switch has been turned ON. Therefore, IC6-10 is "L" and Q6 is OFF.

The signal shown in the diagram appears at the emitter of Q1. When this signal is applied to the set input of the flip-flop at the top, Q becomes "H" and \bar{Q} becomes "L" and this condition is maintained. As a result, IC6-3 becomes "H" and Q5 is turned ON, then D2 and 25D are lit. Since IC6-11 is "L", Q4 is OFF.

④ Operation when PLAY switch is turned ON with a 17 cm record on the turntable platter

Only the inside phototransistor cannot detect the light and Q3 is OFF. Therefore, the set input of the flip-flop at the bottom is "L". In this flip-flop, Q is "L" and \bar{Q} is "H" when the PLAY switch is ON. In the upper two flip-flops, Q is "H" and \bar{Q} is "L". As a result, among the AND gates, only IC6-10 is "H". Therefore, Q4 and Q5 are OFF and Q6 is ON. D3 and 17D are lit.

The lead-out position for 17 cm records is different from that for 30 cm and 25 cm records, so another return detection LED is provided. This is D5 which is lit in this case.

III. Speed selection circuit

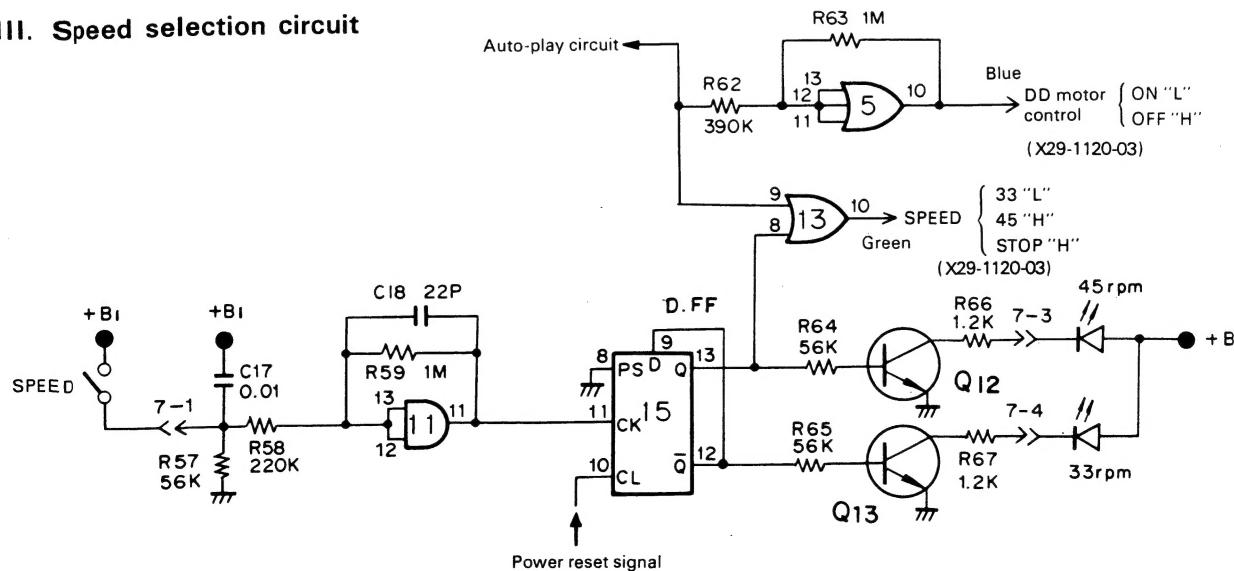


Fig. 1 Speed selection circuit

4. Record size detection (2) (Refer to Schematic Diagram 3.)

Light emitted from the light detection LEDs is detected by the phototransistor Q3 built into the search arm to control the motion of the tonearm. When Q3 detects light, its emitter becomes "H" (The tonearm at this time is in the lead-in position.). The OR gate output IC4-4 becomes "H". This output is differentiated with C10 and R35 so that a positive pulse is obtained. This positive pulse is applied to IC14-1 to stop the tonearm drive motor and turn the plunger OFF. (Refer to IV "Tonearm motion".)

5. Return detection (Refer to Schematic Diagram 3.)

Return detection is performed by LED D4 (for 25/30 cm records), LED D5 (for 17 cm records) and phototransistor Q2. D4 is always lit and D5 is lit only when a 17 cm record is being played. (Refer to "Record size detection (1), Paragraph 4".)

① 25/30 cm record

When the search arm reaches the return detection position, Q2 is shielded from the light of D4 and so IC1-4 becomes "L". Then, IC7-4 becomes "H". As a result, a positive pulse is generated by C9 and R34. This pulse is applied to IC4-2 to invert the plunger flip-flop (refer to Schematic Diagram 6) and is also applied to IC15-4 to reset the D-FF. (Refer to "Motor ON delay circuit, Paragraph C" and "Rotational direction determination circuit, Paragraph C".) When the REPEAT switch is OFF, IC9-13 is "H". As IC9-12 is set to "H" by the return detection signal, IC9-11 becomes "H". This signal resets the PLAY-FF, thus IC10-10 is "H" and IC14-6 is "L". (Refer to "Auto Play") Therefore, IC13-1 becomes "L" and Q7 is turned OFF, so that LED goes off. (IC13-2 is also "L".)

② 17 cm record

D5 is used instead of D4. Other operations are the same as in Paragraph ① above.

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

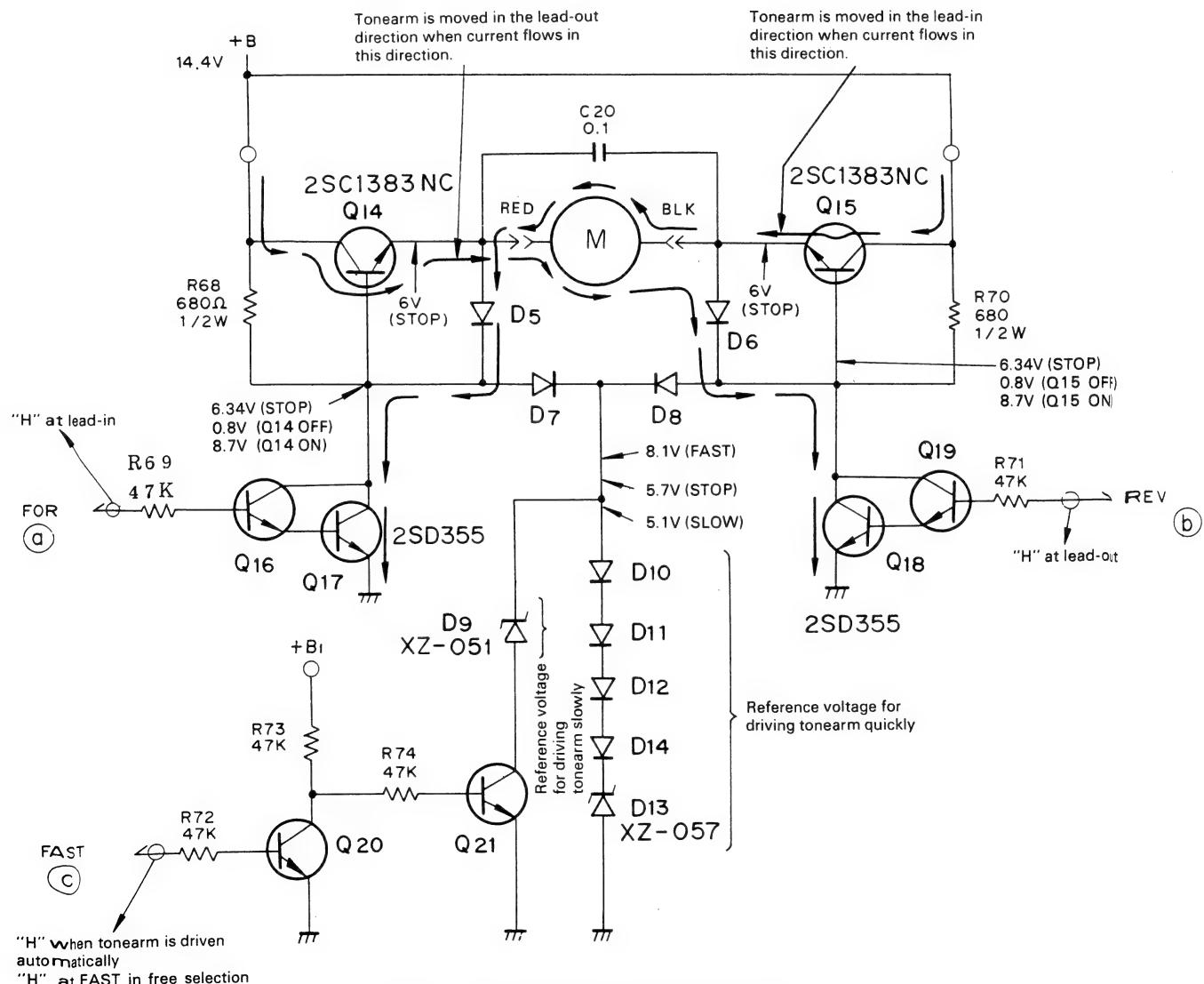
The power reset signal is applied to CL of the D[•]FF of the D[•]FF immediately after power is turned ON, and Q becomes "L" and \bar{Q} becomes "H". Q13 is turned ON and the 33 rpm indicator LED is lit. Q is connected to the DD motor speed selecting OR gates. IC13-8 ~ 10, so IC13-8 is "L". As explained in "Automatic play", first IC8-11 (IC13-9) is "H". When the PLAY switch is pressed in this condition, IC13-10 becomes "L". This output signal is sent to the motor control circuit (X29-1120-03) to set the motor speed to 33 rpm. At the same time, the Schmitt trigger output IC5-10 becomes

"L" and the DD motor starts. CL of the D[•]FF becomes "L" soon so that D[•]FF is able to read the CK input. When D is "H" (\bar{Q} is "H", i.e. 33 rpm condition is set) and a clock is input to CK, Q becomes "H" and \bar{Q} becomes "L". (Refer to "D[•]FF".) As a result, Q13 is turned OFF while Q12 is turned ON so that the 45 rpm LED is lit. At this time, D drops to "L" and D[•]FF (T[•]FF) will be inverted by the next clock pulse. Further, since IC13-8 becomes "H", IC13-10 becomes "H" to set the motor speed to 45 rpm.

IV. Tonearm Motion

1. Tonearm drive motor drive circuit

The tonearm is moved by means of the tonearm drive motor and gears. The motor drive circuit is shown in Fig. 1.



FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

This motor drive circuit switches two constant current circuits (one consisting of Q14 and a Zener diode and the other consisting of Q15 and a Zener diode) so that the motor is supplied with current in either direction and can rotate in either direction. D10 through D14 compensate the temperature characteristics of the input with their negative temperature characteristics. D7 and D8 form an OR circuit.

The signals shown in Table 1 are given from the rotational direction determination circuit to the inputs (a), (b) and (c).

STOP	(a): L (b): L	
Lead-in	(a): H (b): L	
Lead-out	(a): L (b): H	
During Tonearm movement in auto-play FAST motion or in free selection		(c): H
► or ▲ in free selection		(c): L

Table 1

a STOP

Since both (a) and (b) are "L", Q16 through Q19 are OFF. Q14 and Q15 operate in the active region and the potential with respect to GND at both terminals of the motor becomes the same. Thus, the motor does not rotate. At this time, the circuit impedance viewed from the motor is low and so the motor, if it has been rotating, stops rapidly.

b Lead-in

Since (a) is "H" and (b) is "L", Q16 and Q17 are ON and Q18 and Q19 are OFF. Q14 is OFF and Q15 operates in the active region. Therefore, the motor drive current flows through Q15 (emitter) → motor → D5 → Q17 (emitter).

c Lead-out

Since (a) is "L" and (b) is "H", Q16 and Q17 are OFF and Q18 and Q19 are ON. Q15 is OFF and Q14 operates in the active region. Therefore, the motor drive current flows through Q14 (emitter) → motor → D6 → Q18 (emitter).

d Switching tonearm drive speed

When the tonearm is driven in automatic play operation or FAST is selected in free selection, Q20 is ON and Q21 is OFF. Therefore, the Zener voltage of the constant current circuit becomes about 8.7V (= voltage across D13 (XZ-057 : 5.7V) + voltage across D8, D10 through D12, D14 ($0.6V \times 5 = 3V$)). When ► or ▲ is selected in free selection, Q21 is ON. Therefore, the voltage across D9 (XZ-051 : 5.1V) becomes effective. In the latter case, the voltage supplied to the motor is low, so the motor rotates more slowly.

2. Tonearm drive motor control circuit

① Initialization of PLUNGER (Solenoid) Flip-flop
(Refer to Schematic Diagram 1.)

The power reset signal is applied to IC14-2 immediately after power is turned ON and IC14-9 becomes "L". As IC4-1 and -2 are "L", IC4-3 is "L". Both IC10-5 and -6 become "L", so that IC10-4, i.e. IC14-8, becomes "H". Therefore, after the

power reset signal has disappeared, Pin 4 of the PLUNGER•FF is kept at "H" and Pin 9 at "L". IC4-1 is also kept at "L".

Initialization of the PLUNGER•FF is now complete.

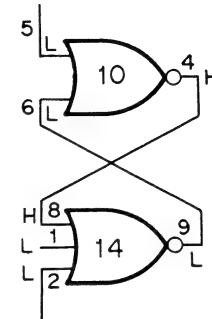


Fig. 2 Initialization of PLUNGER•FF

② Motor ON delay circuit

(Refer to Circuit Diagram 6.)

This circuit turns the drive motor ON after the tonearm has been fully lifted up by the plunger. The circuit consists of a one-shot multivibrator. It is initialized as shown in Schematic Diagram 6. This circuit operates when a) PLAY switch is turned ON, b) at the time of return detection or c) when the CUT switch is turned ON. (Refer to "Free selection".)

Note:

PLUNGER•FF means the flip-flop controlling the up/down of the tonearm.

a) PLAY switch is turned ON

A positive pulse is applied to IC4-1 when the PLAY switch is turned ON, and the PLUNGER•FF inverts its state.

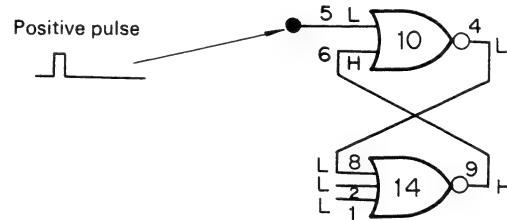


Fig. 3 State of FF after PLAY switch ON

Since IC14-9 becomes "H", IC14-10 drops to "L" so that a negative pulse is applied to IC10-13. IC10-11 becomes "H" for an instant, but it returns to "L" after C13 is fully charged. This period during which IC10-11 is "H" is the delay time. See the following timing diagram.

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

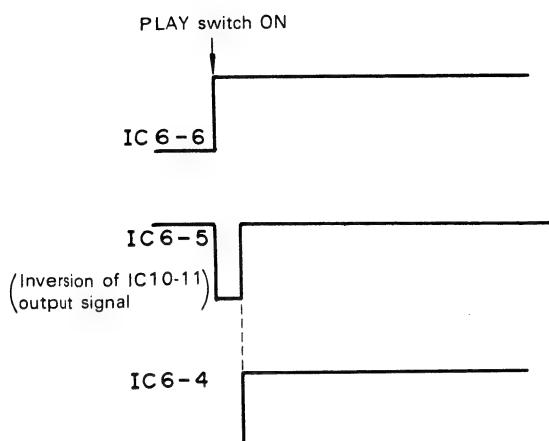


Fig. 4 Timing diagram

When IC6-4 is "H", the drive motor rotates and the tonearm is moved. When the tonearm reaches the lead-in position, the plunger FF is inverted by the size detection signal. Therefore, IC10-4 is "H" and IC14-9 is "L". At this time, the AND gate output, IC6-4, immediately drops to "L" and the drive motor is turned OFF.

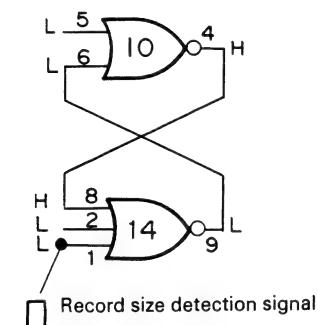


Fig. 5 State of FF after lead-in

b) Return detection

When the tonearm reaches the return detection position, the PLUNGER•FF is again inverted with the return detection signal. IC10-4 becomes "L" and IC14-9 becomes "H". Operation after this is the same as in Paragraph a) above.

c) CUT switch is turned ON

Operation is the same as in Paragraph b).

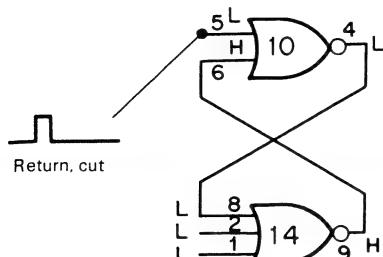


Fig. 6 State of FF after return detection or CUT

③ Rotational direction determination circuit (Refer to Schematic Diagram 6.)

This circuit determines the motion of the drive motor, that is whether it is rotating clockwise or counterclockwise or if it stopped. The signals from this circuit are sent to the tonearm drive motor drive circuit.

a) Drive motor rotation signal (Forward)

A positive trigger signal is applied to IC15-1 ~ 6, PS of the D•FF, when the PLAY switch is turned ON, so that Q becomes "H" and \bar{Q} becomes "L". IC9-8 becomes "H". IC9-10 becomes "H" when the motor ON delay signal is applied to IC9-9. Then, IC1-10 becomes "H" and the motor rotates so that the tonearm moves forward.

b) Drive motor stop signal after lead-in

IC6-4 becomes "L" and IC9-9 becomes "L", then IC1-10 becomes "L". Therefore, the motor stops. IC9-4 is also "L".

c) Drive motor rotation signal (Reverse)

When the return detection signal is applied to CL of the D•FF, Q becomes "L" and \bar{Q} becomes "H". This signal also inverts the PLUNGER•FF, so IC9-1 is set to "H" through the motor ON delay circuit. IC9-3 becomes "H" and IC9-5 also "H". As IC9-6 is "H" unless the tonearm is on the arm rest, IC9-4 is "H". This "H" signal turns the motor so that the tonearm moves in reverse.

d) Motor stop signal generated after the tonearm returns to the arm rest.

When the tonearm reaches the position over the arm rest, IC9-6 becomes "L" and the motor stops.

④ Free selection (Refer to Schematic Diagram 5)

a) Operation when ▲ switch is turned ON

When ▲ switch is turned ON, a positive pulse is applied to PS of the T•FF, IC12-8, via IC13-11, so Q (IC12-13) is set to "H". This "H" signal is applied to IC5-5 to lift the tonearm. This signal is also applied to the motor ON delay circuit so that IC7-15 is set to "L" for an instant and then set to "H". Since IC8-6 is kept at "H" while the switch is kept pressed, IC8-4 is "H". Therefore, the drive motor rotation signal (forward) is sent to the tonearm drive motor drive circuit.

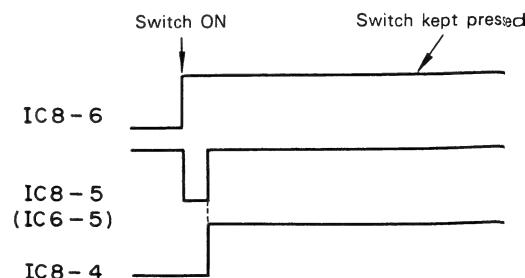


Fig. 7 Timing diagram

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

b) Operation when ▶ switch is turned ON

Operation is similar to that explained in Paragraph a) above. The difference is as follows: IC8-3 becomes "H" instead of IC8-4, so the drive motor rotation signal (reverse) is sent to the motor drive circuit via an AND gate (IC9-4, 5, 6).

⑤ Tonearm fast drive signal (Refer to Schematic Diagram 1.)

a) AUTO PLAY

Both IC13-12 and -13 are "L", so IC8-9 is "H". When the PLAY switch is turned ON, IC8-8 becomes "H". Therefore, IC8-10 becomes "H" and IC13-4 becomes "H".

b) When ▲ or ▼ switch is turned ON

Either IC13-12 or IC13-13 is "H", so IC8-10 becomes "L" and IC13-4 becomes "L".

c) When FAST switch is turned ON

Since IC13-5 is turned to "H", IC13-4 becomes "H".

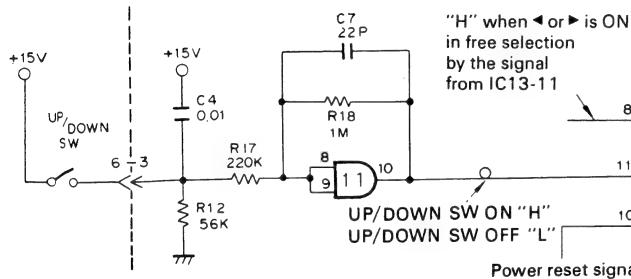


Fig. 8 Tonearm up/down control circuit

② When UP/DOWN switch is turned ON

T-FF (IC12-8 ~ 13) has been initialized by the power reset signal. Therefore, Q is "L" and \bar{Q} is "H", and IC5-5 is "L".

When the UP/DOWN switch is pressed once, a positive pulse is applied to CK of the T-FF through the Schmitt trigger (IC11-3 ~ 10) which is provided to prevent erroneous operation. Therefore, IC5-5 is turned to "H" and the tonearm is lifted. This condition is maintained till power is turned OFF.

When the UP/DOWN switch is pressed again, T-FF is inverted and the tonearm is lowered.

While the tonearm is kept in the lifted position, Q9 is ON and so UP LED is lit.

③ When ▲ or ▼ switch is turned ON

When either switch is pressed once, a pulse is applied to PS of T-FF, i.e. IC12-8, so that Q becomes "H" and \bar{Q} becomes "L". Operation after this is the same as in Paragraph 2 above.

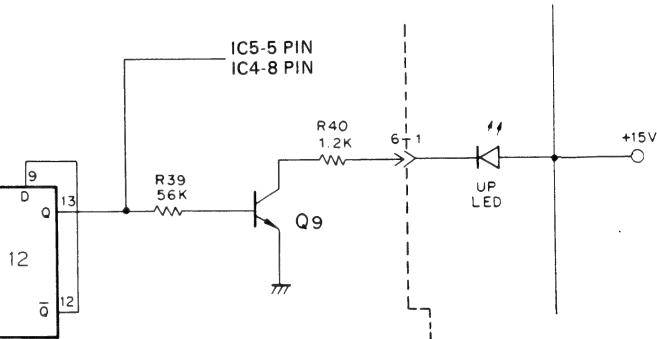
3. Up and down motion of tonearm
(Refer to Schematic Diagram 1.)

① AUTO PLAY

When the PLAY switch is turned ON, Pin 9 of the PLUNGER flip-flop is set to "H" to turn Q10 and Q11 ON via an OR gate (IC5-3 ~ 6). Therefore, the plunger is turned ON to lift the tonearm.

At the lead-in position, the PLUNGER flip-flop is inverted, so that the tonearm is lowered. However, since IC5-4 is delayed for the time determined by C12 and R46 in dropping to "L", the tonearm is delayed for a moment before it is lowered.

At the lead-out position, the PLUNGER flip-flop is inverted again. Therefore, the tonearm is lifted. When the tonearm returns to the arm rest, the PLUNGER flip-flop is inverted and the tonearm is lowered. The operation controlled by the return detection signal when the CUT switch is ON is the same as that of when the PLAY switch is ON.

V. AUTO PLAY operation
(Refer to Schematic Diagram 3)

Process of automatic play of a 30 cm record is explained here. The tonearm must be on the arm rest before turning the PLAY switch ON. At this time, IC8-13 is "H".

1. Initialization of PLAY-FF

Pin 8 of IC2 (NOR gate) is connected to +B through $\bar{I}4$, that is, its level is "H". IC2-9 is "L" as will be explained later. Therefore, IC11-6 (IC2-10) is "L", and IC11-4 is "L". Thus, the set input of PLAY-FF, IC10-8, is "L". The power reset signal is applied to IC14-4 via IC5-1 immediately after power is turned ON. Therefore, IC14-4 becomes "H" for an instant, and IC14-6 becomes "L". This "L" level is applied to the upper NOR gate (IC10-8 ~ 10) and IC10-10 becomes "H". Since this "H" level is applied to IC14-5, IC14-6 is kept at "L" after the power reset signal has disappeared. Thus, PLAY-FF is initialized. Since IC8-12 is "H", IC8-11 is "H". Therefore, IC5-10 is "H" and the DD motor does not operate. IC2-9 is set to "L" through the inverter (IC7-6, 7).

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

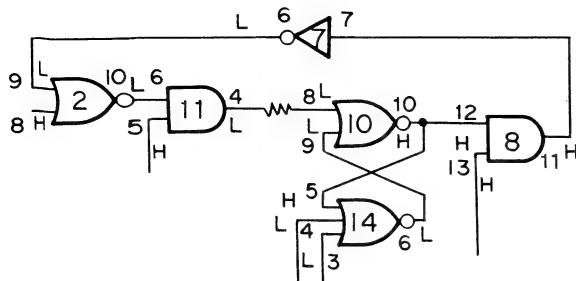


Fig. 1 Initialization of PLAY-FF

2. When PLAY switch is turned ON

IC2-8 becomes "L". Since IC2-9 is "L", IC2-10 becomes "H". Since IC11-5 is "H", IC11-4 becomes "H" and IC10-8 becomes "H". Thus, PLAY•FF is inverted. Since IC10-10 becomes "L", IC8-11 becomes "L" and the turntable platter motor ON/OFF signal becomes "L". Thus, the motor rotates. Since IC13-10 also becomes "L", the motor speed is set to 33 rpm. (Refer to "Speed selection circuit".) The "H" level signal from IC14-6 is sent to the tonearm drive circuit, and the tonearm starts moving. (Refer to "Tonearm motion".) Further, Q7 is turned ON so that the LEDs relating to a 30 cm record are able to light.

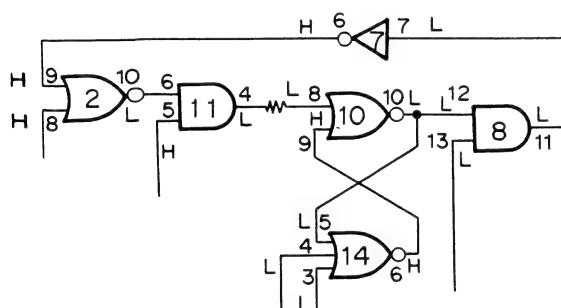


Fig. 2

3. Lead-in

When the tonearm reaches the lead-in position, IC4-4 is set to "H" by the record size detection signal. A positive pulse is applied to the PLUNGER•FF (IC14-1) by means of C10 and R35. As explained in "Tonearm motion", the tonearm stops transverse motion and is lowered to the record surface.

4. Lead-out

When the tonearm reaches the lead-out position, IC7-4 is set to "H" by the return detection signal. A positive pulse is applied to IC4-2 and IC15-4 by means of C9 and R34. Then, the tonearm is lifted and moved toward the arm rest.

5. Return to arm rest

When the tonearm reaches the position over the arm rest, IC1-3 is set to "H" by the arm rest-position detection signal. This "H" level signal is sent to the tonearm drive circuit via IC7-2, 3 so that the drive motor stops. It is also sent to the

LED drive circuit to turn LEDs OFF. A positive pulse is generated with C5 and R20 and it is applied to PLAY•FF to invert its state. Thus, IC10-10 (IC8-12) becomes "H". Since IC8-13 has become "H", IC8-11 becomes "H" so that the DD motor is stopped. Further, IC4-4 becomes "H" and a positive pulse is given to IC14-1 by means of C10 and R35, then the PLUNGER•FF is inverted and the tonearm is lowered.

VI. AUTO CUT operation

Operations when the CUT switch is turned ON during the playing of a record is explained here. Refer to the diagram showing the stable state of the PLAY•FF after the PLAY switch is turned ON. When the CUT switch is turned ON in this condition, IC2-13 is set to "L", so IC2-11 becomes "H". (IC2-12 is "L" because the tonearm is not on the arm rest.) This "H" level signal inverts the PLAY•FF, then IC10-10 becomes "H" and IC8-12 becomes "H". The pulse generated by C8 and R32 is applied to IC4-2 and IC15-4 so that the tonearm is lifted and moved toward the arm rest.

Operations after the tonearm returns to the arm rest are the same as explained in "AUTO PLAY". The only exception is that the PLAY•FF will not be inverted when the arm rest position is detected, because it has already been inverted.

VII. AUTO REPEAT

IC12 in the auto-repeat circuit is reset by the power **reset** signal (which is applied to Pin 4). Therefore, Q is "L" and \bar{Q} is "H". When the REPEAT switch is turned ON, a positive pulse is applied to CK of IC12, so IC12 is inverted. Since Q becomes "H", Q8 is turned ON and the REPEAT indicator is lit. At the same time, IC13-2 becomes "H" and Q7 remains conducting. While the tonearm is moving to the arm rest after return detection, the search arm detects the size of the record. As a result, the tonearm stops and drops at the lead-in position and play is restarted.

The auto-repeat condition is reset at the time when power is turned ON, the CUT switch is turned ON or the tonearm is returned to the arm rest by hand.

VIII. C-MOS Schmitt trigger

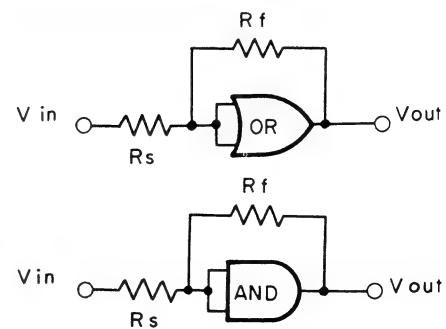


Fig. 1

FULL AUTOMATIC MECHANISM CONTROL OF KD-850 (X29-1160-00)

A Schmitt trigger can be formed by setting up a circuit using a C-MOS AND gate or OR gate as shown in Fig. 1. This circuit utilizes the threshold level (V_{TH}) of the C-MOS circuit. In a C-MOS, the level UTL (Upper threshold level) at which the output changes from "L" to "H" and the level LTL (lower threshold level) at which the output changes from "H" to "L" have characteristics similar to hysteresis curves.

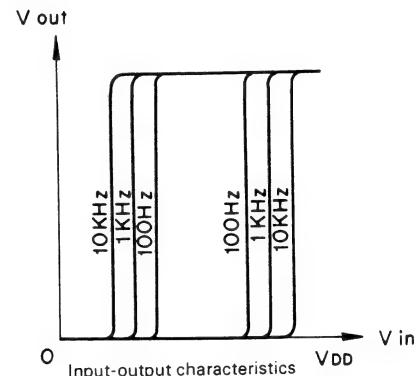
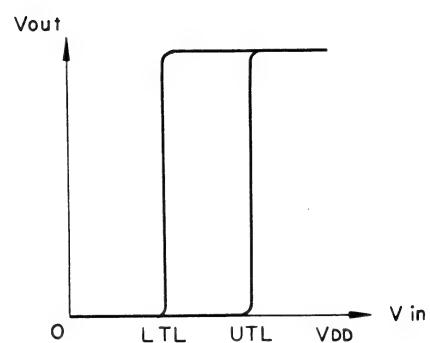
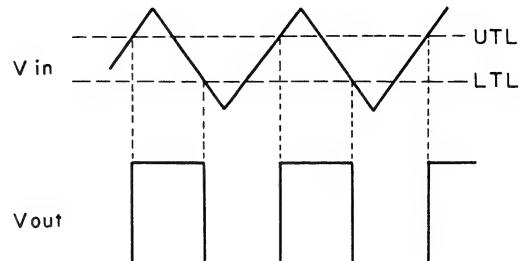
UTL and LTL are given as follows:

$$\left\{ \begin{array}{l} UTL = \frac{Rs + Rf}{Rf} + V_{TH} \\ LTL = \frac{Rs + Rf}{Rs} \cdot (V_{TH} - \frac{Rs}{Rs + Rf} \cdot V_{DD}) \end{array} \right.$$

Then, noise margin V_{NI} is given as

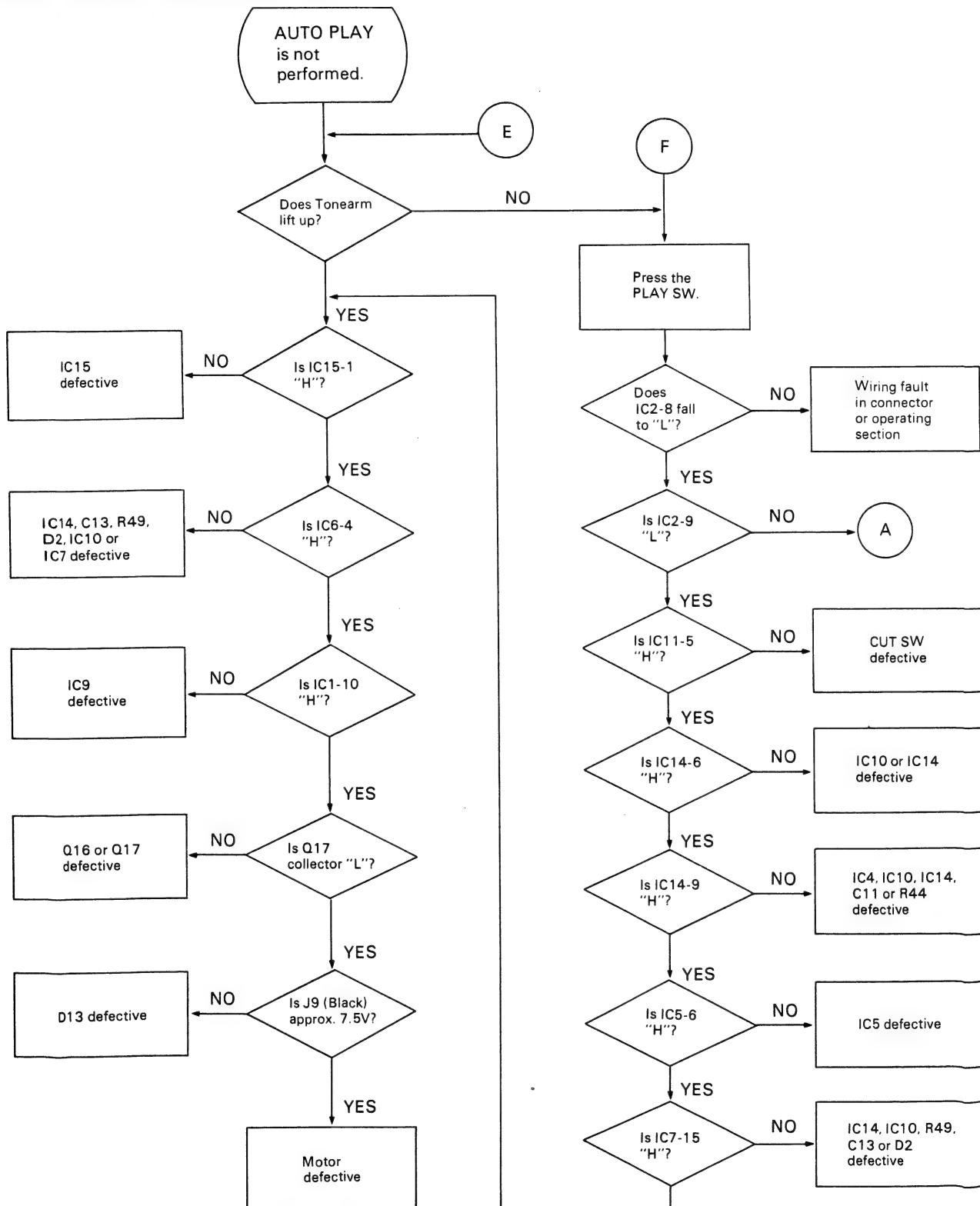
$$V_{NI} = UTL - LTL = \frac{Rs}{Rf} \cdot V_{DD}$$

By connecting a small capacitor in series with Rf , frequency dependent hysteresis characteristics can be obtained.

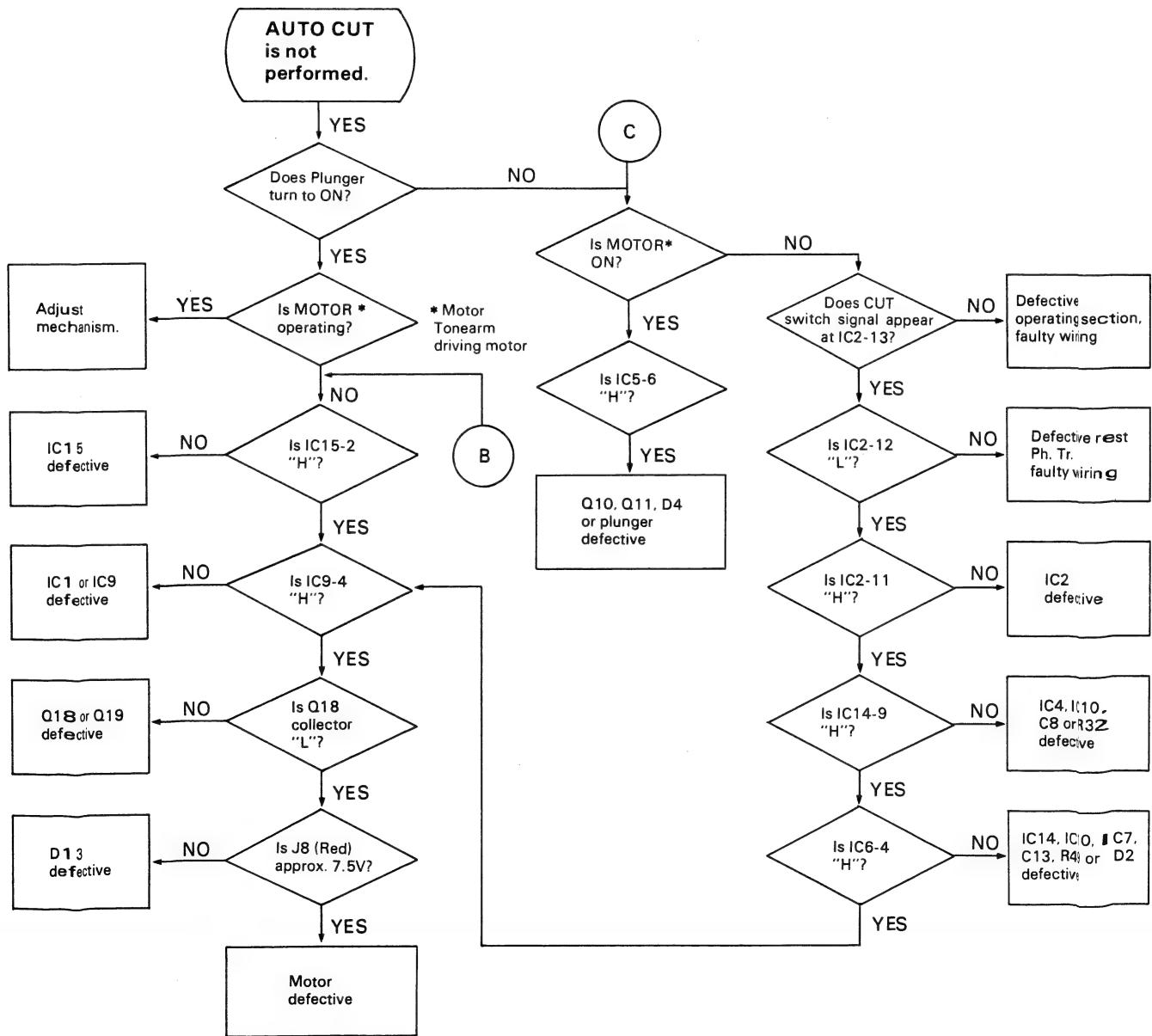
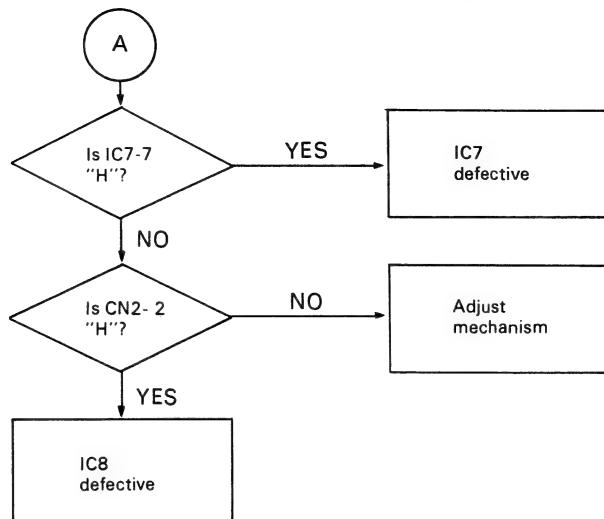


TROUBLESHOOTING

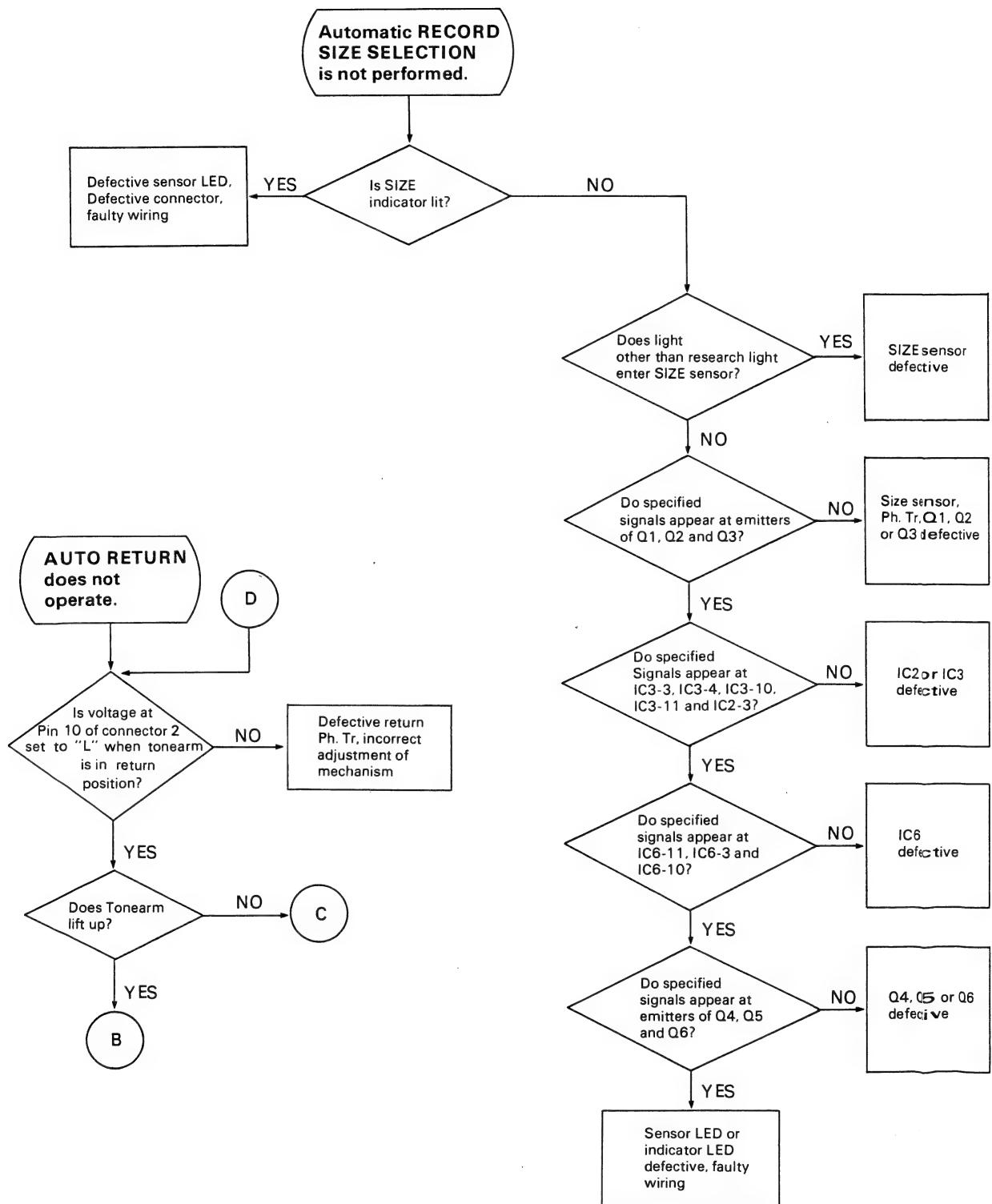
X29-1160-00: Mechanism control PCB



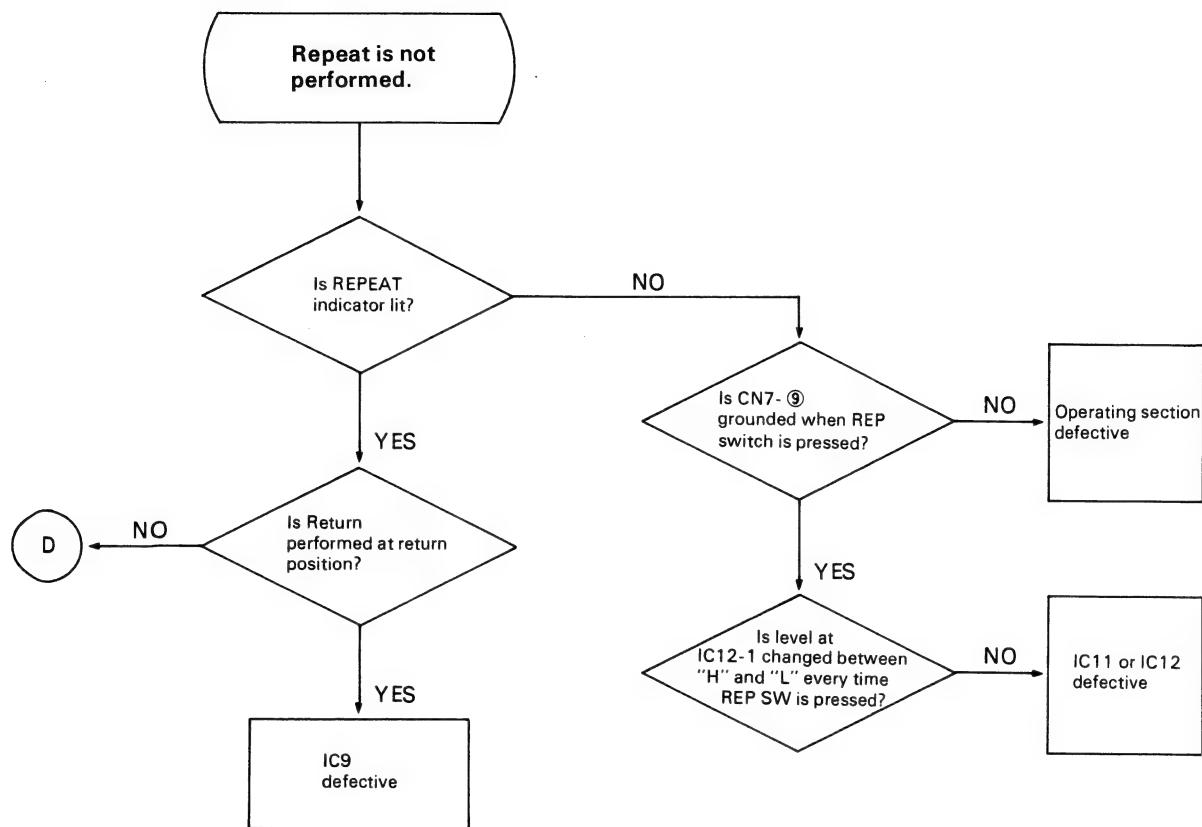
TROUBLESHOOTING



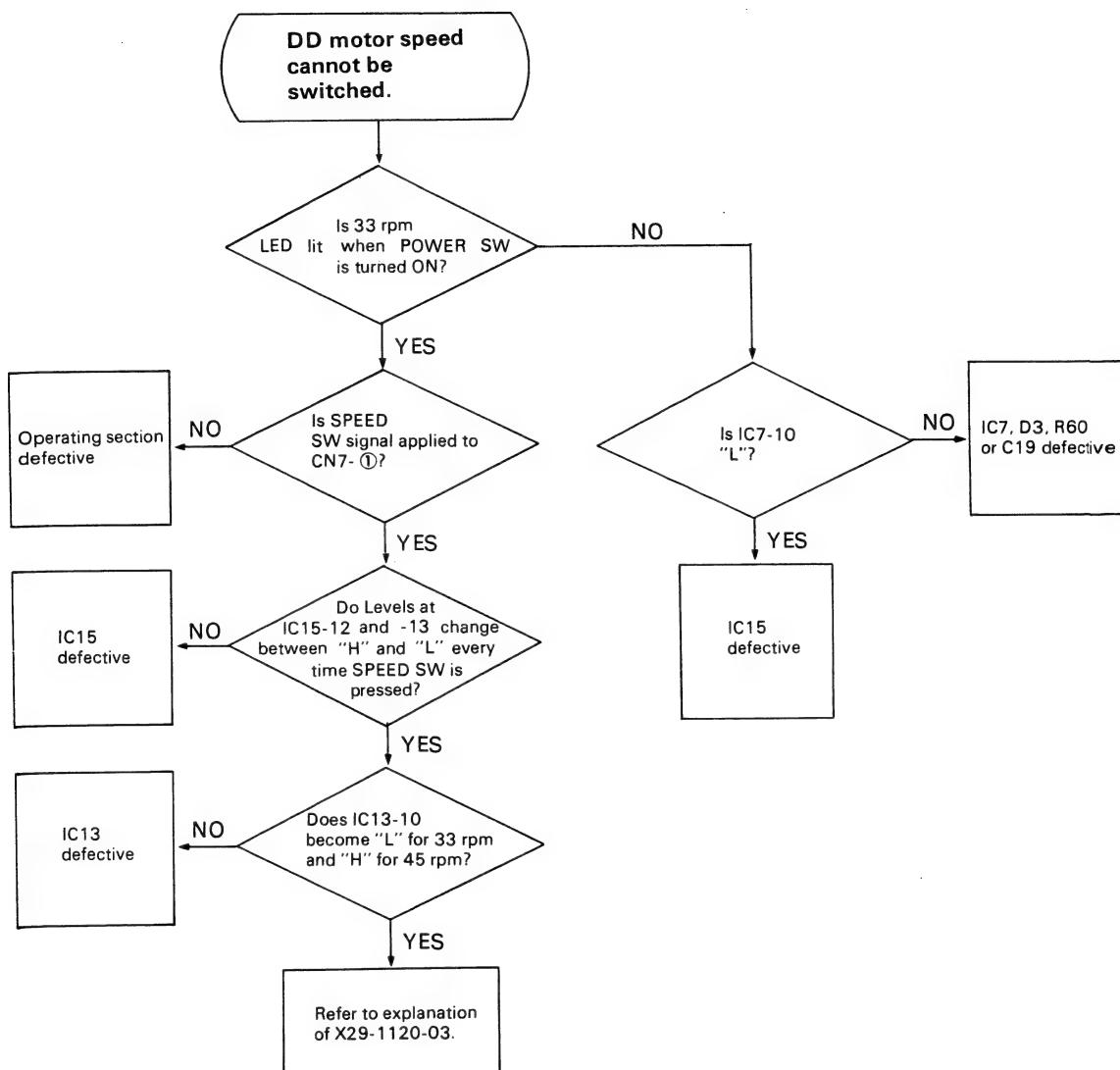
TROUBLESHOOTING



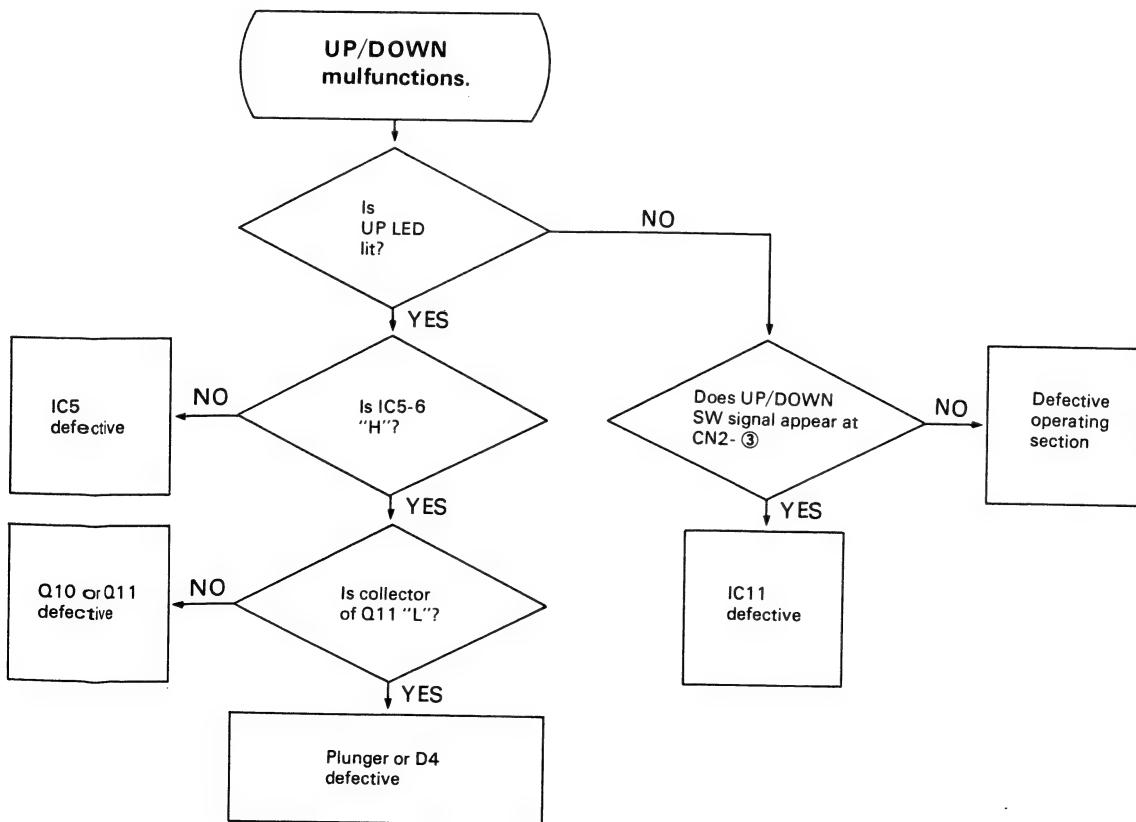
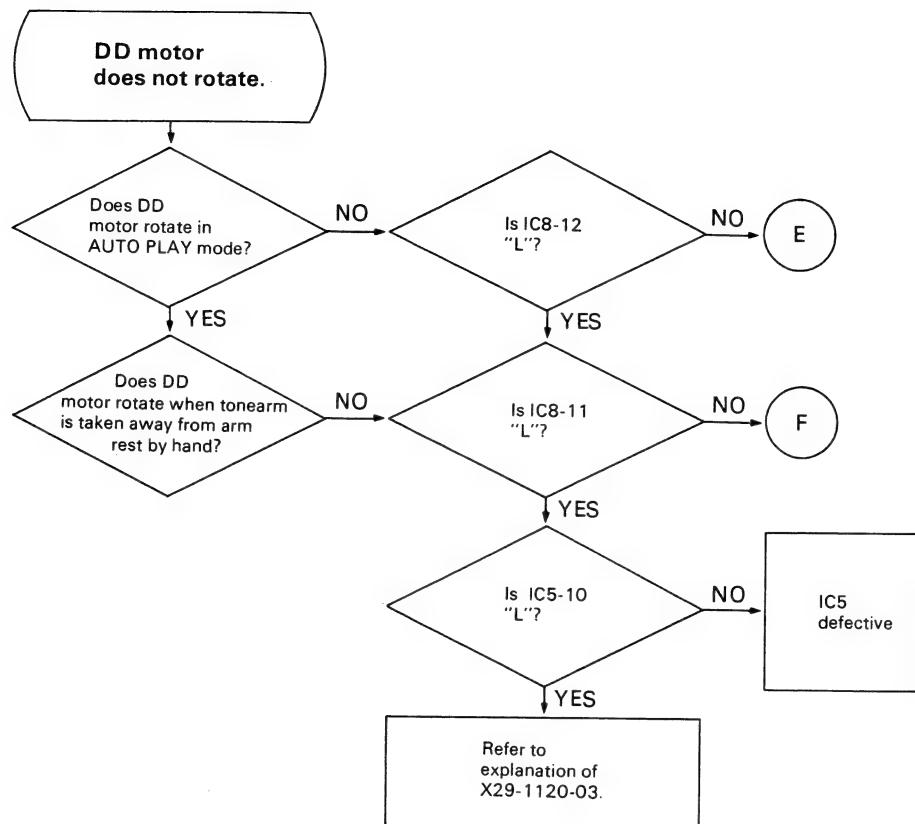
TROUBLESHOOTING

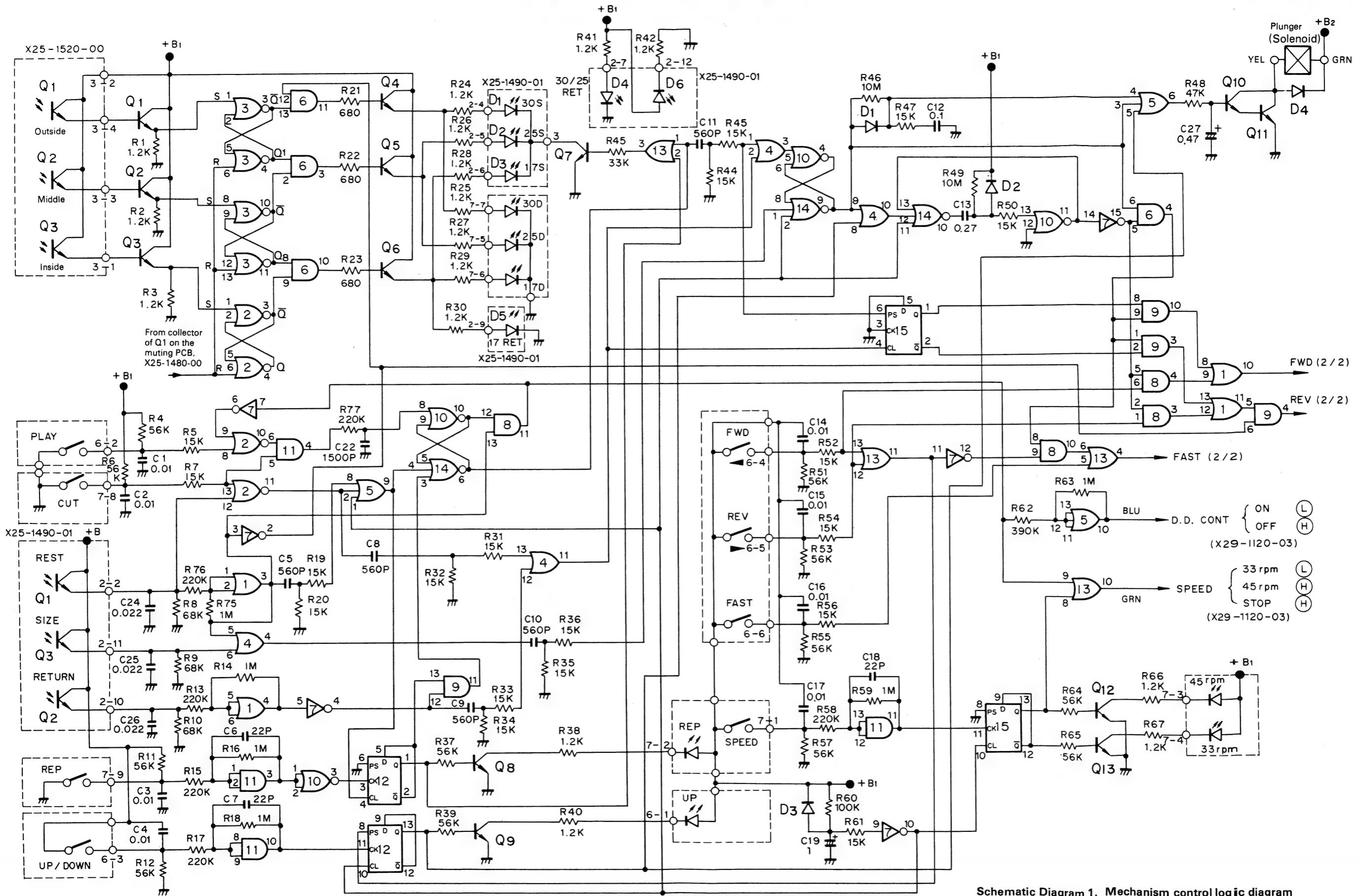


TROUBLESHOOTING

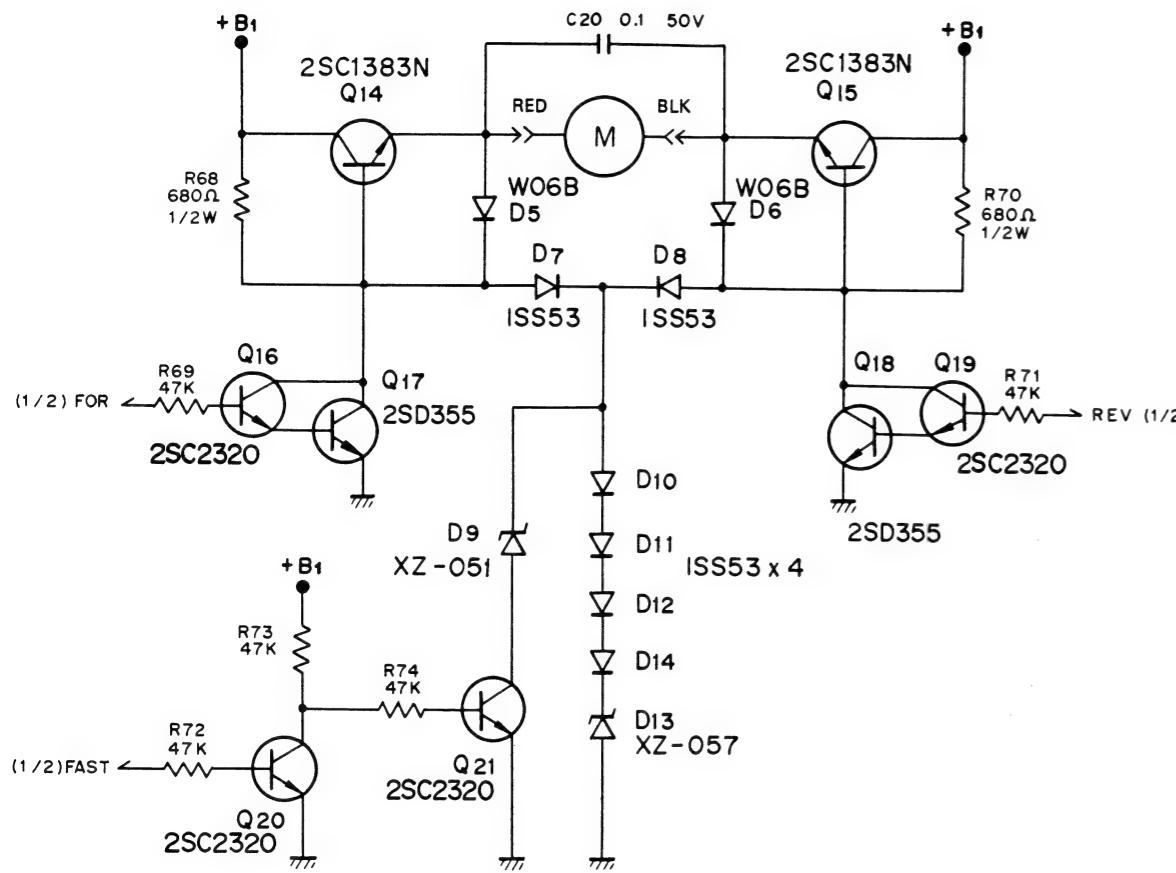


TROUBLESHOOTING

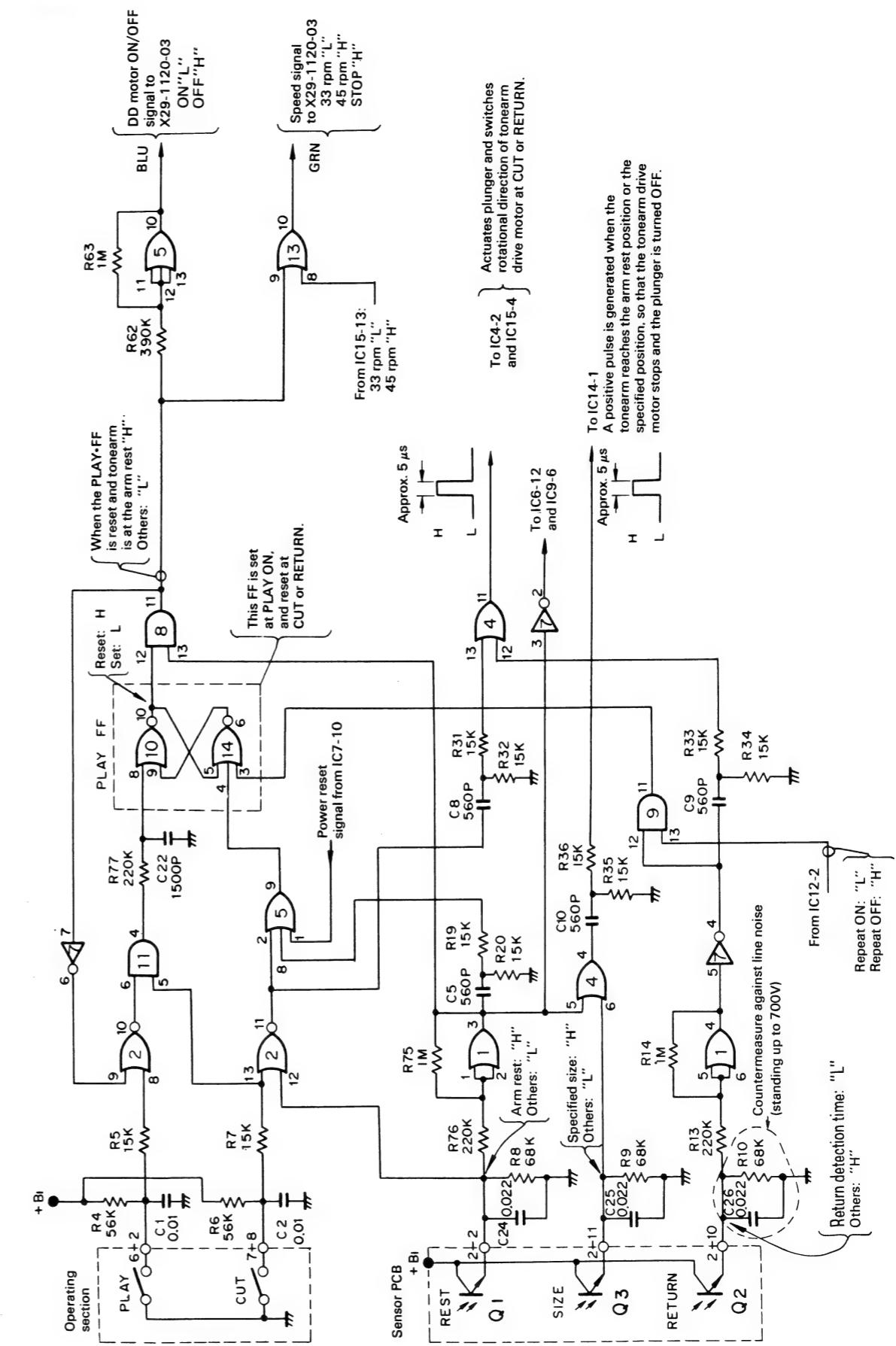




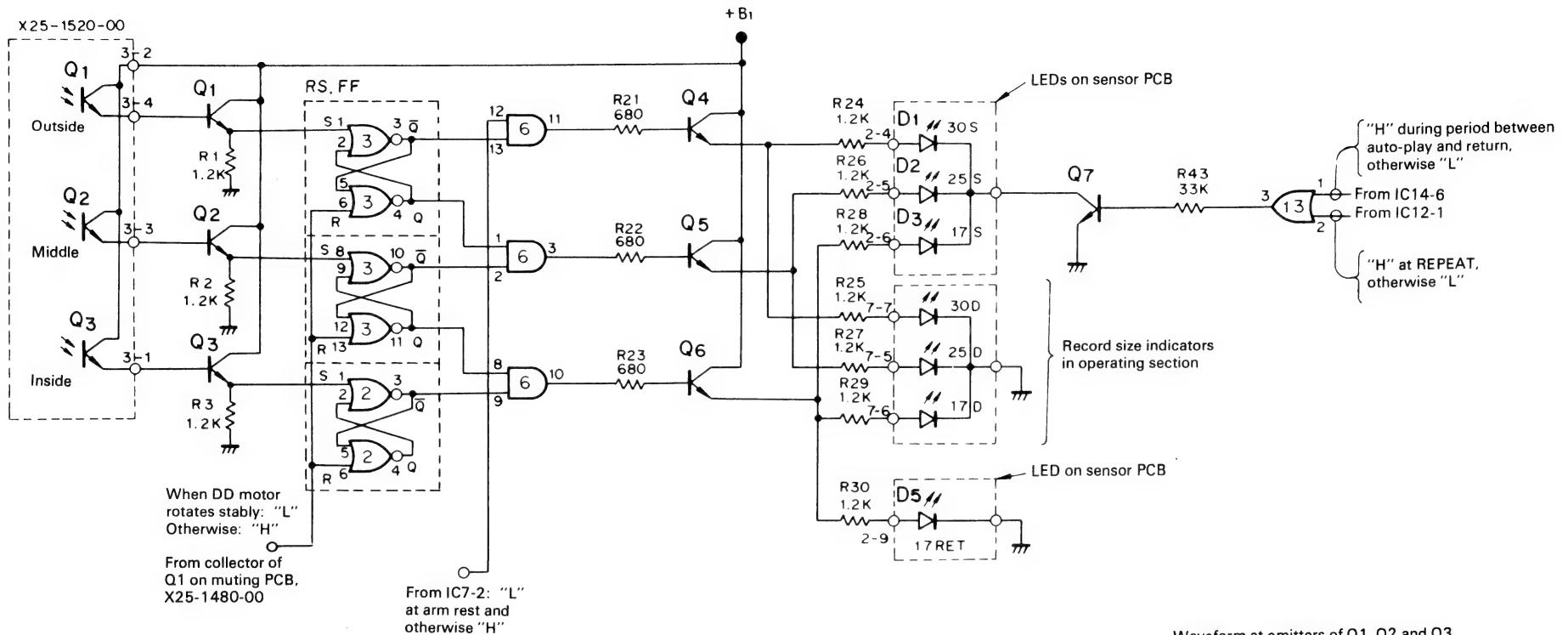
Schematic Diagram 1. Mechanism control logic diagram



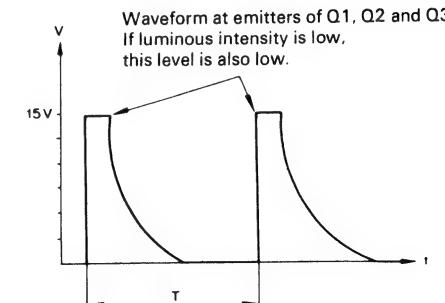
Schematic Diagram 2 Mechanism control circuit



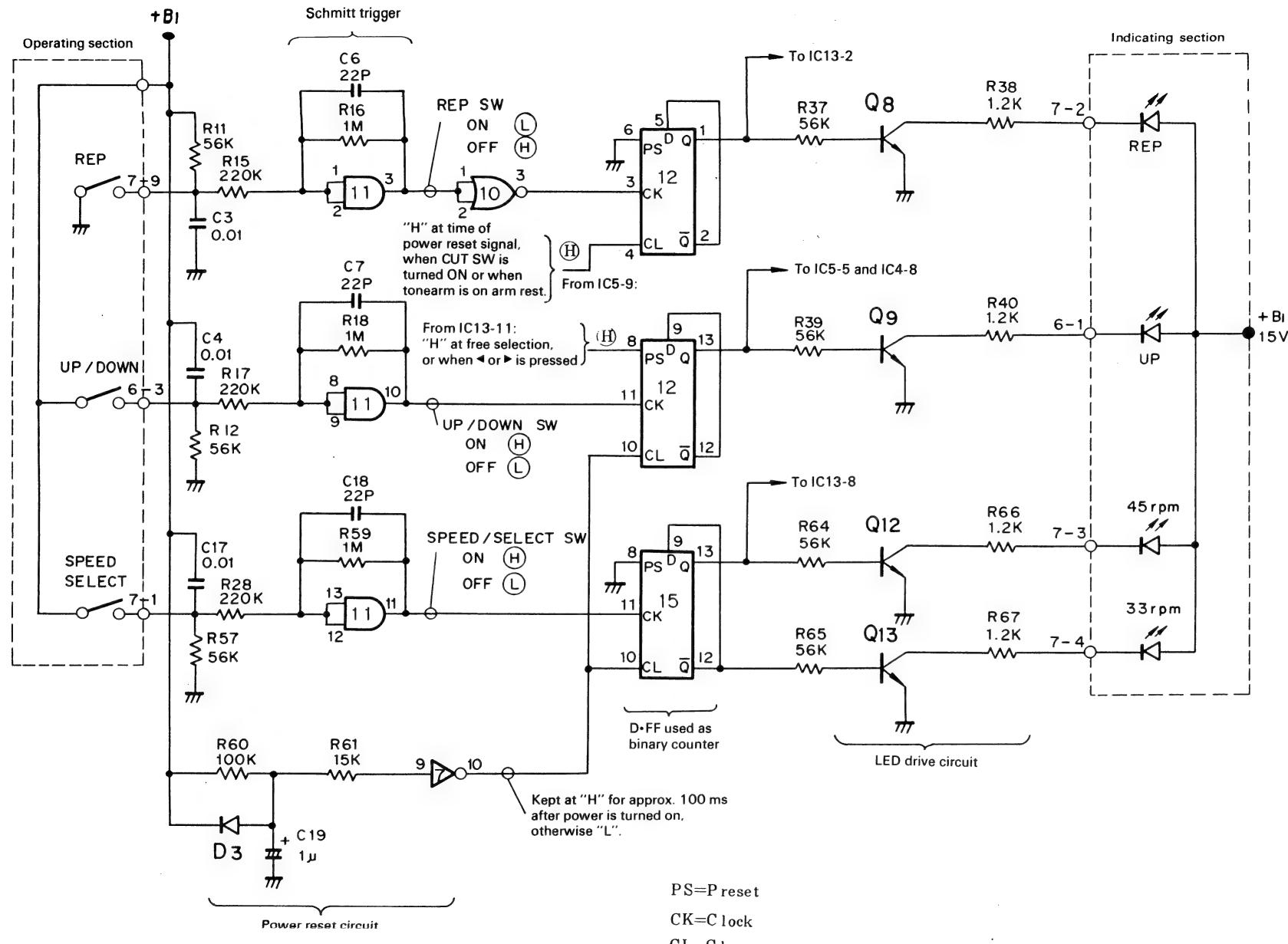
Schematic Diagram 4 Record size detection circuit



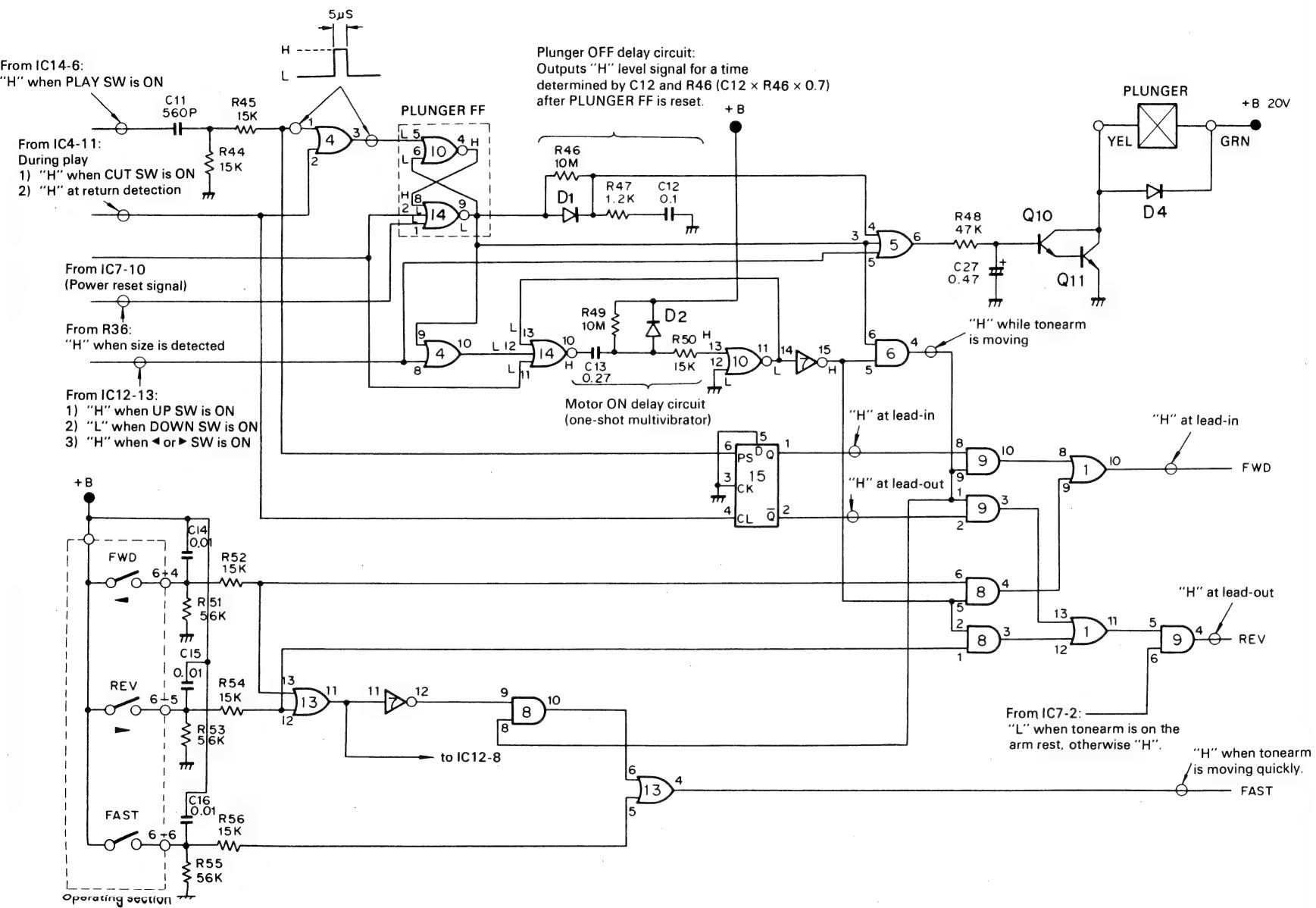
Record size	IC3 3 pin	IC3 4 pin	IC3 10 pin	IC3 11 pin	IC2 3 pin	IC6 11 pin	IC6 3 pin	IC6 10 pin
30 cm	H	L	H	L	H	H	L	L
25 cm	L	H	H	L	H	L	H	L
17 cm	L	H	L	H	H	L	L	H
None	L	H	L	H	L	L	L	L



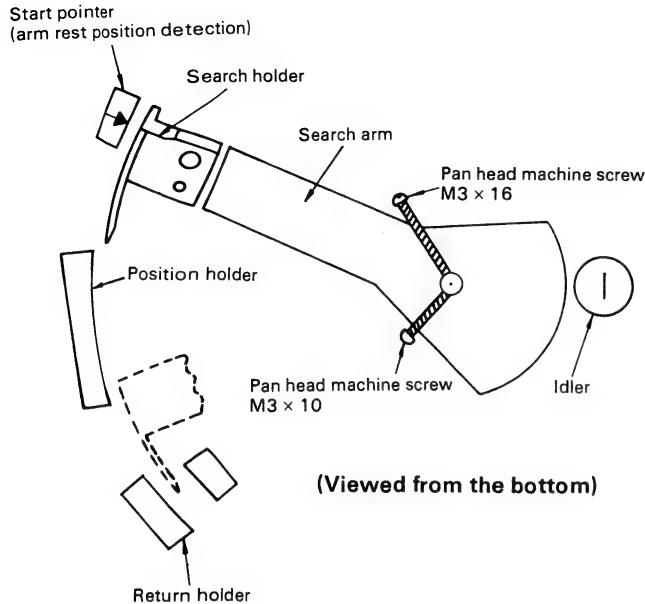
Schematic Diagram 5



Schematic Diagram 6 Drive motor control circuit and tonearm up/down circuit

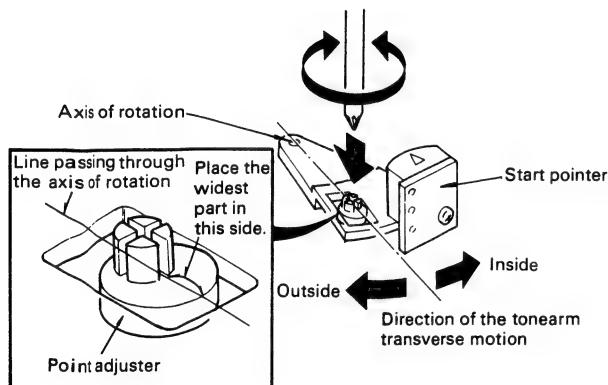


INSTALLATION OF AUTOMATIC MECHANISM ASS'Y



1. Installation of Start Pointer and Return Holder

Adjust the start pointer and return holder positions so that the cross on each point adjuster coincides with the line passing through the axis of rotation. (Adjustment of the start pointer is shown below.)

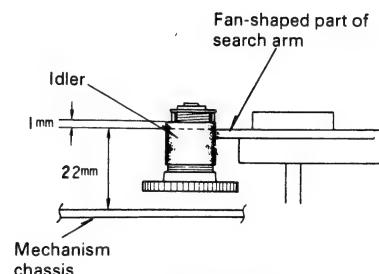
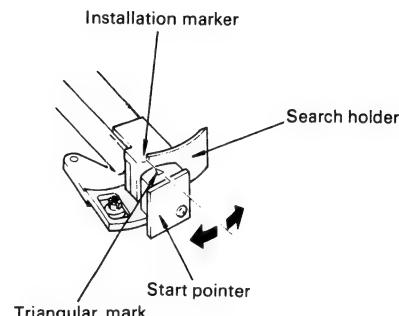


Notes:

- The start pointer position affects detection of the arm rest position and determination of the auto-in and auto-return and determination of the auto-in and auto-return positions. If it is placed in a wrong position, the automatic mechanism may malfunction, for example, the turntable platter may not stop even if the tonearm returns to the arm rest position. Adjust the start pointer accurately.
- Adjustment of the return holder point adjuster is explained in the Paragraph "Adjustment of Auto-return Position".

2. Installation of Search Arm

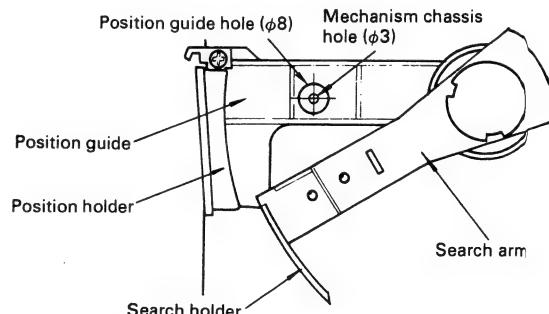
- Adjust the tonearm height adjuster so that the tonearm is as low as possible.
- Fix the tonearm on the arm rest.
- Install the search arm so that its installation marker is aligned with the triangular mark of the start pointer and the relationship between the search arm and the idler becomes as shown below, then tighten the pan head machine screws, M3 x 16 and M3 x 10.



Cross section

3. Installation of Position Guide

Align the center of the hole of the position guide with the center of the hole of the mechanism chassis.



ADJUSTMENT (AUTOMATIC MECHANISM)

In adjustment of the automatic mechanism, Test Record 3 (P-3027) (parts No.: T99-0204-05) is used. Check the cartridge for the following before adjustment: 1) overhang, 2) whether the stylus is exactly aligned with the center line of the tone arm pipe. (2) is especially important. The arm lifter pin must have been adjusted.

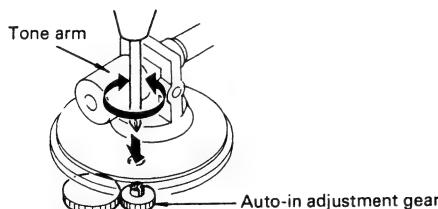
1. Specifications of Test Record

Play the test record at 45 rpm.

BAND (Side A)	Contents		Use
1	30 cm lead-in test groove		Auto-in adjustment
	L-ch: voice (1-65)	R-ch: 1 kHz	
2	25 cm lead-in test groove		
	L-ch: voice (1-65)	R-ch: 1 kHz	
3	17 cm lead-in test groove		
	L-ch: voice (1-65)	R-ch: 1 kHz	
4	30/17 cm lead-out test groove		Auto-return adjustment
	L-ch: voice (1-59)	R-ch: 315 kHz	

2. Adjustment of Auto-in Position

1. Place the test record on the turntable platter, set the speed to 45 rpm and press the PLAY button.
2. Adjust the auto-in adjustment gear so that the spoken count recorded in band 1 is between 20 and 27 when play starts.

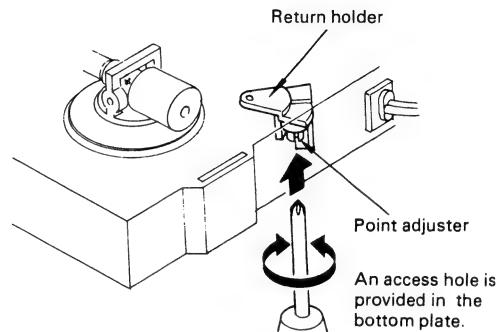


Note:

As the auto-in adjustment gear is turned clockwise, the tone arm moves towards the center, and vice versa.

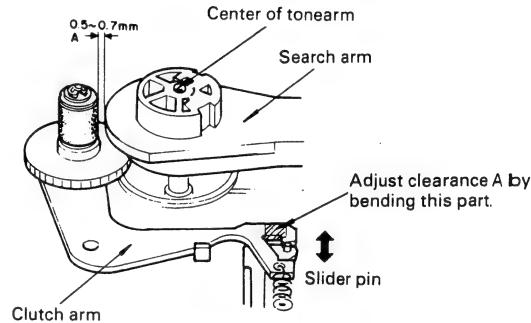
3. Adjustment of Auto-return Position

1. Play band 4 of side A of the test record.
2. Adjust the point adjuster of the return holder so that the spoken count is 13 when the tonearm automatically returns.



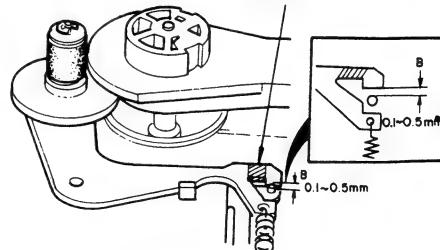
Adjustment of auto-return position

4. Clearance Adjustment of Idler and Clutch Arm



<Plunger: OFF> (Solenoid)

Adjust clearance B by bending this part. Bend as little as possible so the force of spring is transferred to the search arm.



<Plunger: ON> (Solenoid)

Note:

When the automatic mechanism is removed and then installed again in the turntable, the above clearances may vary. Install the automatic mechanism carefully.

ADJUSTMENT (X29-1120-03)

Adjustment (X29-1120-03)

Adjusting method is the same as that of KD-650.

Before adjustment:

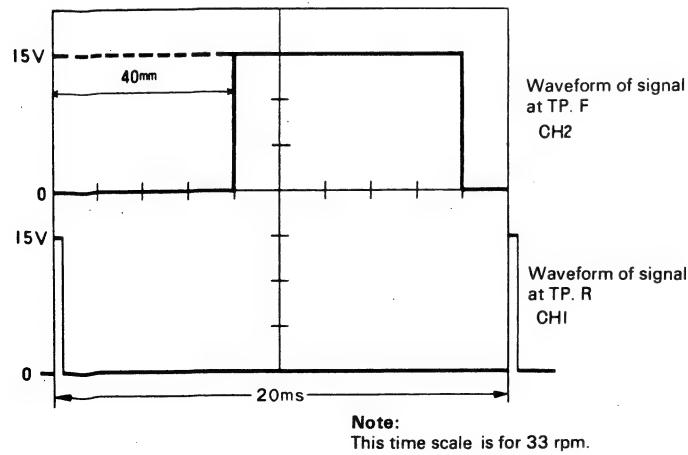
- An oscilloscope and a DC voltmeter are necessary. (A 2 CH oscilloscope will facilitate adjustment.)
- Place the turntable horizontally.
- Install the turntable platter and rubber sheet.
- First, carry out adjustment for 33 rpm and then for 45 rpm.
- Set the PC trimming potentiometers VR1 and VR2 (white) on the P.C. board to the center.
- After adjustment of phase difference, carry out adjustment of the lock indicator.

Adjustment:

In the KD-850, both the phase difference (PLL) and the lock indicator lighting range, (including brake OFF timing), require adjustment.

1. Adjustment of phase difference (PLL) (Using a single channel oscilloscope)

1. Apply the reference signal (the output of the X'tal oscillator: TP. R) to the oscilloscope and fully expand the waveform on the screen. (Fig. 1)
2. Set the oscilloscope to the external synchronization mode, and apply the reference signal (TP. R) to the external sync terminal. (Now, the oscilloscope is triggered with the reference signal.) Then, apply the FG signal (rotation signal of the motor: TP. F) to the input of the oscilloscope. (Fig. 2)
3. Adjust VR3 (45 rpm) or VR4 (33 rpm) so that the waveform of the FG signal on the screen stops and the waveform shown below (waveform of signal at TP. F) is observed. (Fig. 3)



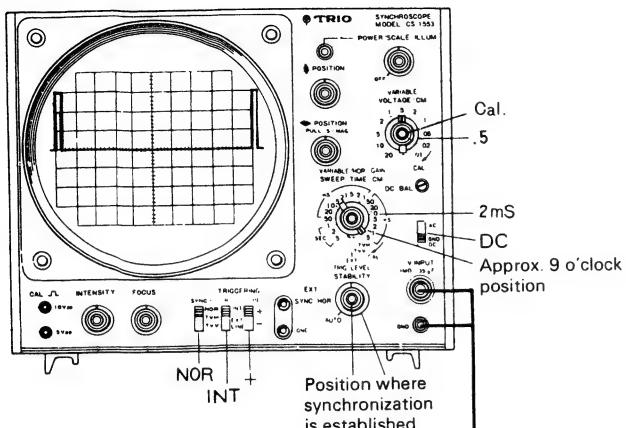
Waveforms observed
on 2 CH oscilloscope

2. Adjustment of lock indicator lighting range and brake OFF timing

1. Connect the DC voltmeter (input imp.: $1\text{ m}\Omega$ or more) to TP. V.
2. Turn the power ON and set the speed to 45 rpm. After the speed has become stable, adjust VR1 so that the voltmeter reading is 265 mV.
3. Perform the same adjustment for VR2 with the speed set to 33 rpm.

ADJUSTMENT (X29-1120-03)

Fig. 1



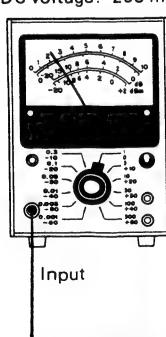
- ① Set the sweep time to 2 mS.
- ② Adjust the trigger level so that synchronization is established.

Note:

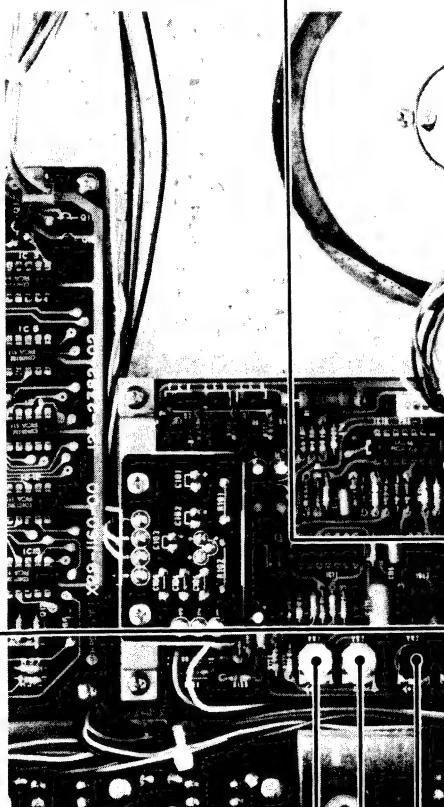
Use a 10:1 probe (input impedance: 10 MΩ or more) for adjustment. If such a probe is not used, connect the oscilloscope via a resistor of 10 kΩ or more to the test point.

- ③ Set the sweep time to 1μs for 45 rpm and expand the waveform to the same scale as that at 33 rpm.

DC voltage: 265 mV

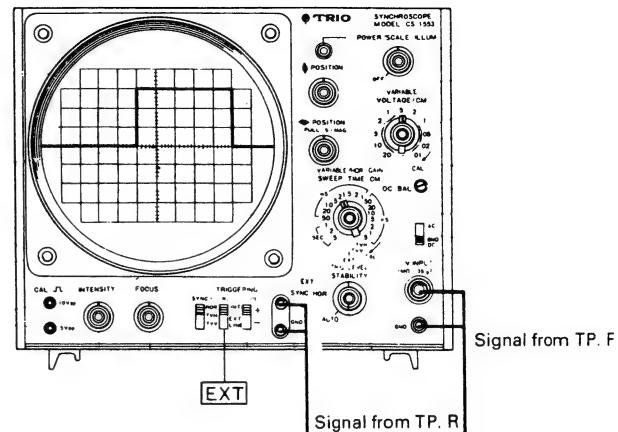


TP. V.



VR1 For lock indicator adjustment
VR2 For phase difference adjustment
VR3
VR4

Fig. 2

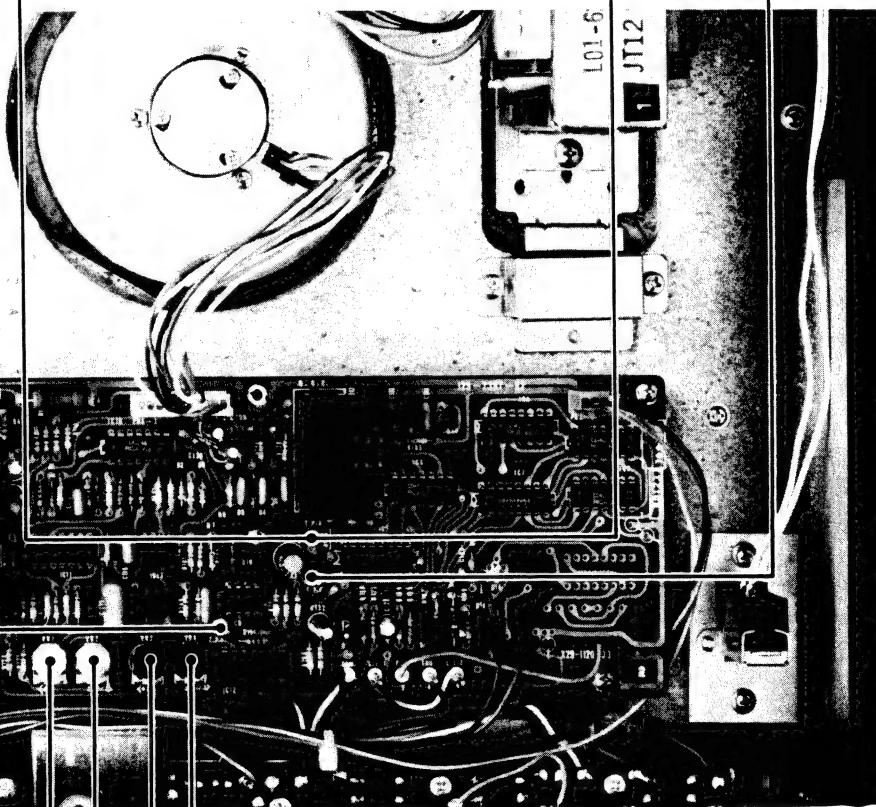


When a 2 CH oscilloscope is used, apply the signal from TP. F to CH1 and the signal from TP. R to CH2, then adjust the phase difference. (Refer to waveforms shown on the previous page.)

Use a 10:1 probe.

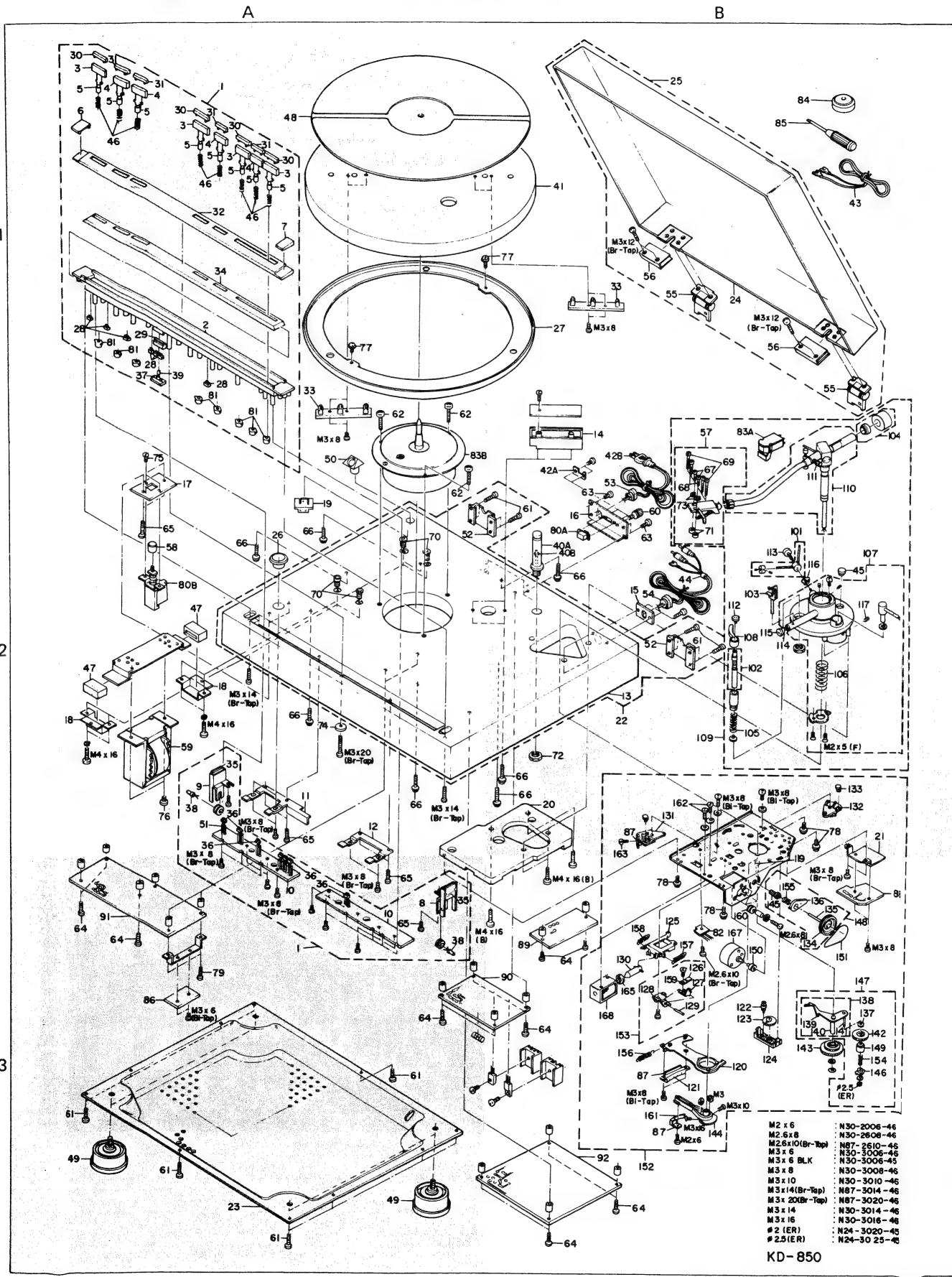
Signal from TP. R

Signal from TP. F



EXPLODED VIEW

See Parts List on page 36.

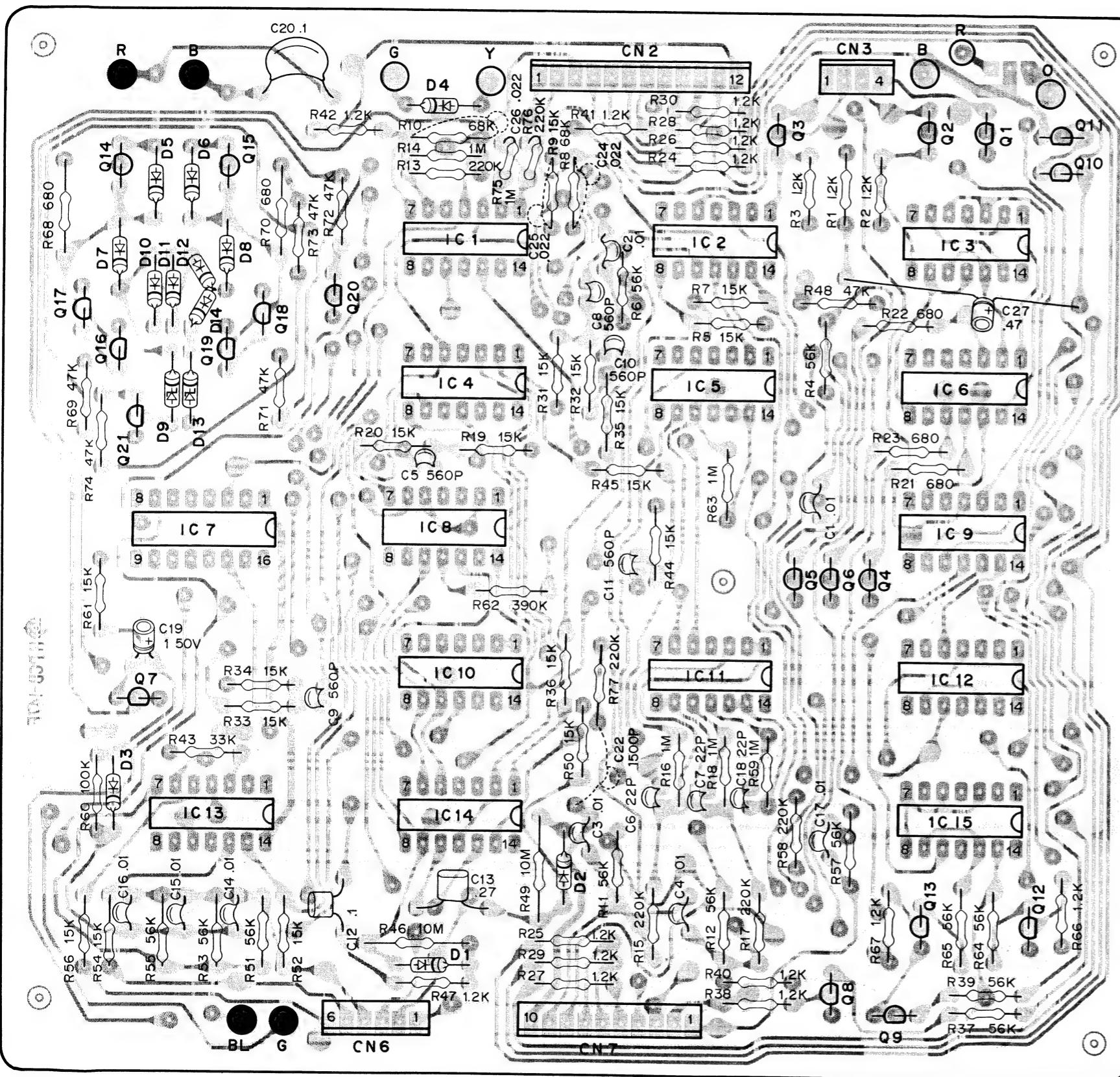


KD-850 **KD-850**

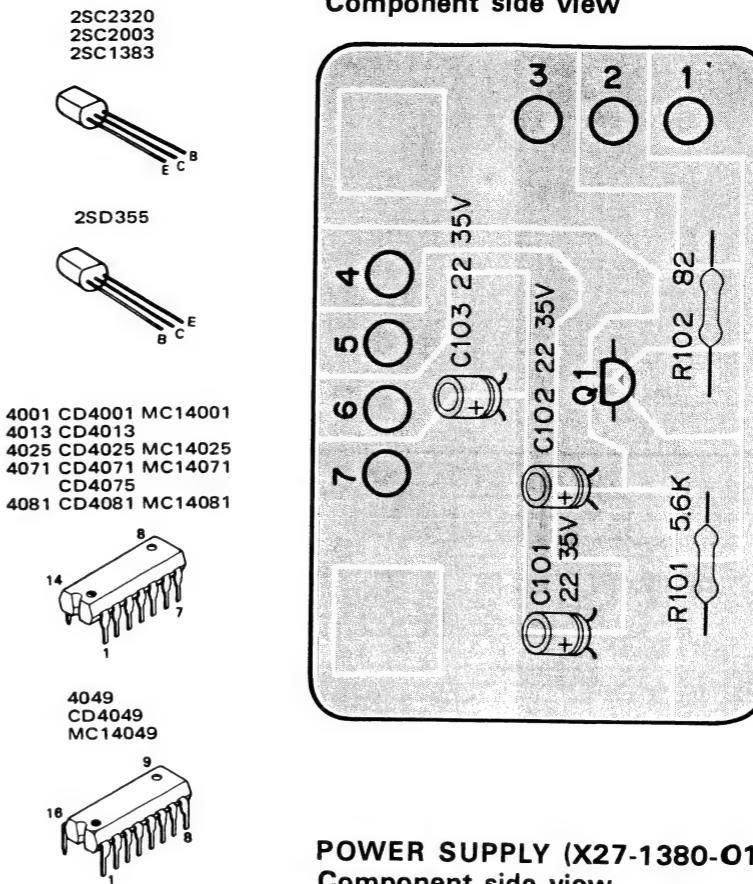
PC BOARD

KD-850

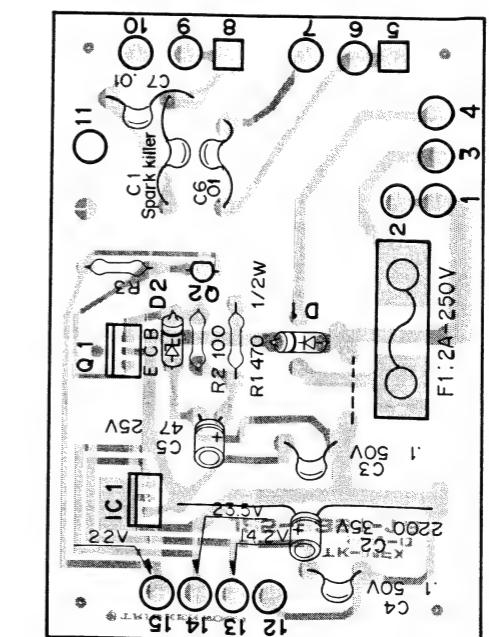
MECHANISM CONTROL (X29-1160-00) Component side view



MUTING (X25-1480-00)



POWER SUPPLY (X27-1380-01) Component side view



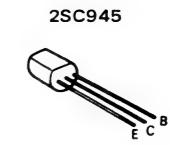
C1 is provided for other than X27-1380-03

C6 is provided for X27-1380-05 only

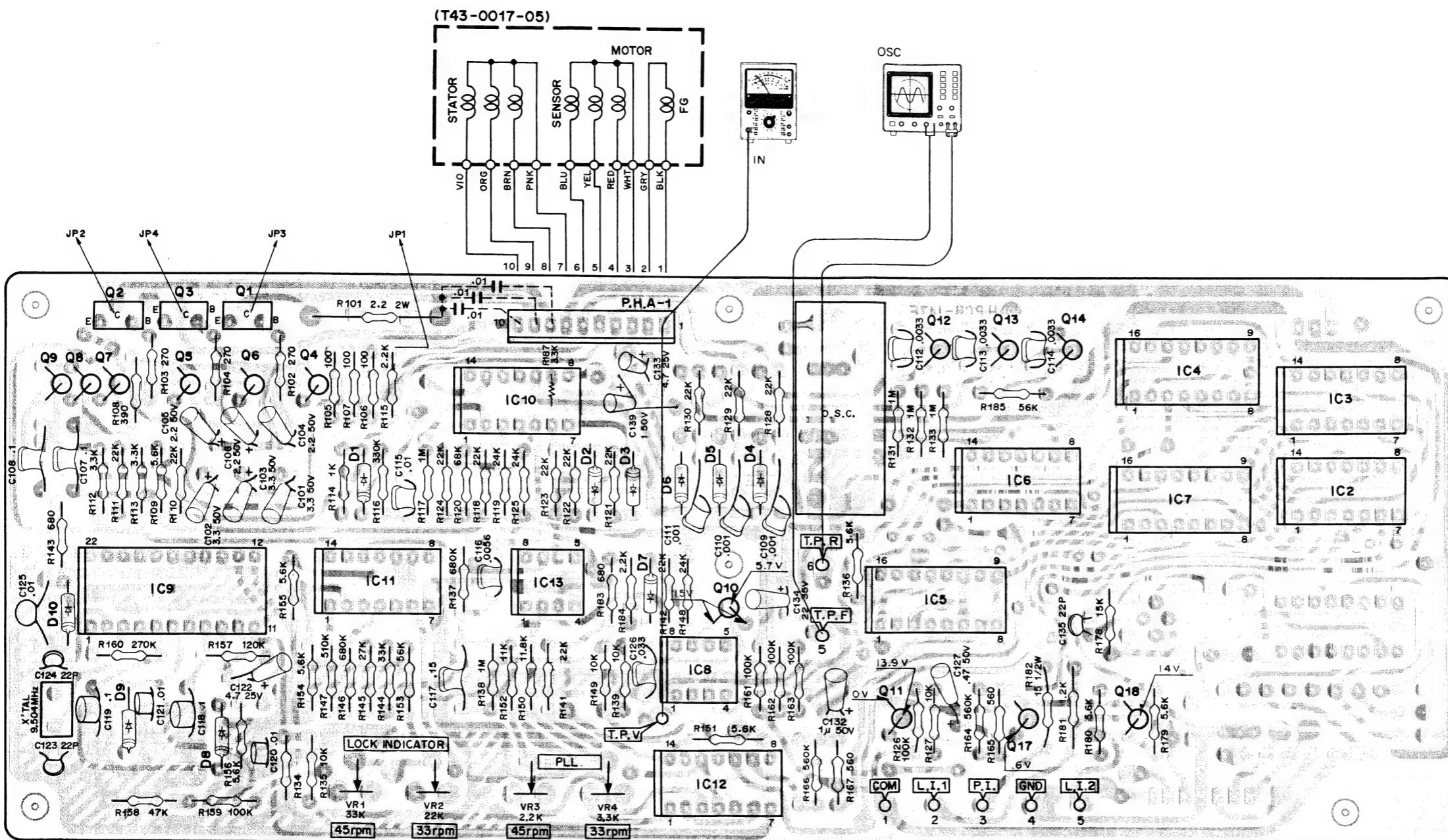
C7 is provided for X27-1380-03 only.

R3 is 2.2Ω for X27-1380-01 and jumper wire For other than X27-1380-01

Q2 is provided for X27-1380-Q1 only.



MOTOR CONTROL (X29-1120-03) Component side view



See DC voltages table left side the schematic diagram.

2SA733
2SC945
2SC2003

2SD 79:

SN168

SM6415A-4S

CA3

CA741C

CD4027
CD4049

DC voltages of X29-1120-03 (Reference value)

: VDD or Vss

(Unit: V)

Pin No.	IC 2		IC 3		IC 4		IC 5		IC 6		IC 7	
	STOP	33 rpm	45 rpm									
1	L	H	H	H	L	L	L	L	L	7.0	7.0	0
2	L	H	H	H	5.8	5.1	H	H	H	7.0	7.0	14.2
3	H	L	L	L	8.4	9.0	H	L	L	7.5	7.4	13.5
4	H	H	H	H	0.2	0.2	H	H	H	L	L	0
5	H	L	L	L	L	H	H	H	H	14.1	0	14.0
6	L	13.3	13.3	L	H	H	H	H	H	L	0	14.1
7	0			0			0			0		L
8	H	H	H	H	5.8	5.1	0			L	*	*
9	L	H	H	H	L	L	0			12.9	*	*
10	H	L	L	L	8.2	8.7	L	*	*	14.2	*	*
11	H	H	H	L	L	L	H	*	*	14.2	*	L
12	L	L	L	H	H	H	0			L	0.1	14.2
13	L	L	L	L	L	L	*	*	L	7.0	7.0	1.5
14	14.2			14.2			L	H	H	5.6	5.1	14.2
15							H	L	L	8.6	9.0	
16										L	L	L

Pin No.	IC 8		IC 10		IC 11		IC 12		IC 13			
	STOP	33 rpm	45 rpm	STOP	33 rpm	45 rpm	STOP	33 rpm	45 rpm	STOP	33 rpm	45 rpm
1	0			0.8	4.0	4.0	0	5.0	0.8	4.9	L	4.9
2	0	0	0	9.2	6.9	6.9	0	1.4	0.8	H	L	14.0
3	0	14.2	14.2	6.9	6.9	6.9	0	1.4	0.8	L	5.2	5.2
4	0	14.2	14.2	14.2			5.4	1.4	4.6	L	H	L
5	0.3	0.2	0.2	6.8	6.8	6.8	0	14.2	0	0.6	L	0.2
6	0.2	0.2	0.2	6.8	6.8	6.8	0	14.2	0	H	L	14.0
7	14.2			6.1	6.2	6.2	0			0		14.2
8	0.6	0.2	0.2	0	6.0	6.0	5.7	1.8	4.9	L	H	H
9				0	0	0	3.8	1.8	1.3	L	H	H
10				0			3.8	1.8	1.3	H	H	H
11				0			3.8	5.2	1.3	5.7	5.2	4.9
12				6.8	6.8	6.8	14.2	0	14.0	L	H	L
13				13.5	7.3	7.3	14.2	0	14.0	L	0.2	L
14				0	0	0	14.2		14.2			

L: OV

H: 14.2V

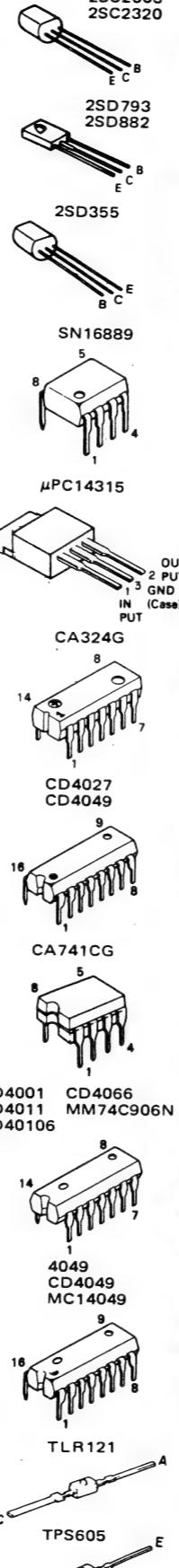
*: Impossible to measure

IC 9	1	2	3	4	5	6	7	8	9	10	11
STOP	5	1.6	1.2	4.4	4.8	4.3	3.8	2.0	1.4	0	1.7
33 rpm		1.6	1.2	2.2	1.4	2.6	1.8	2.7	1.9	2.2	1.3
45 rpm		1.6	1.2	2.3	1.0	2.0	1.3	2.0	1.4	1.6	0.8
IC 9	12	13	14	15	16	17	18	19	20	21	22
STOP	4.7	0	0	5	5	5	0	0	0	0	0
33 rpm	0	0	0								
45 rpm	4.7	0	0								

4001	CD4001	MC14001
4013	CD4013	
4025	CD4025	MC14025
4071	CD4071	MC14071
4081	CD4081	MC14081

2SA733
2SC945
2SC1383
2SC2003
2SC2320

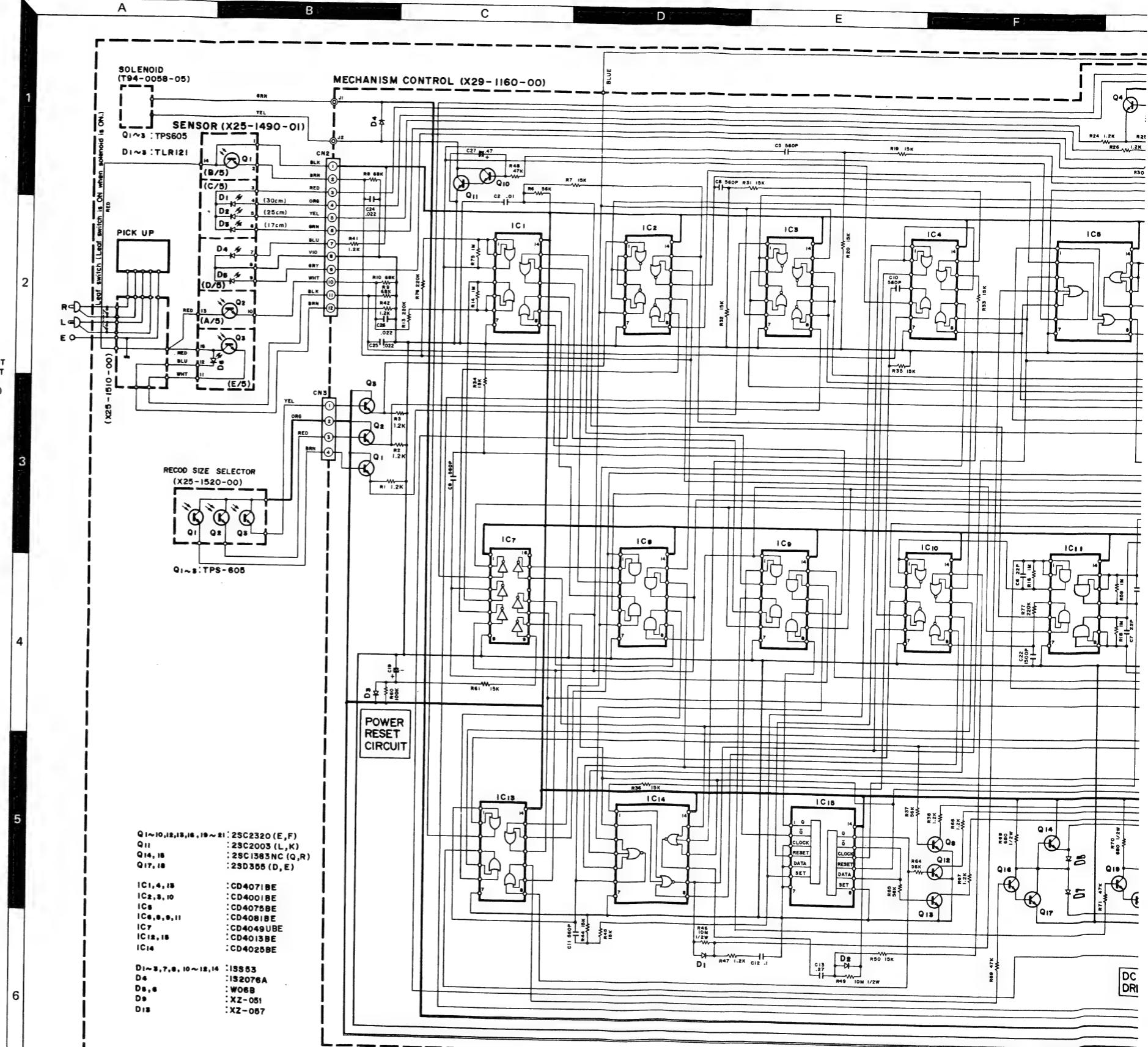
KENWOOD



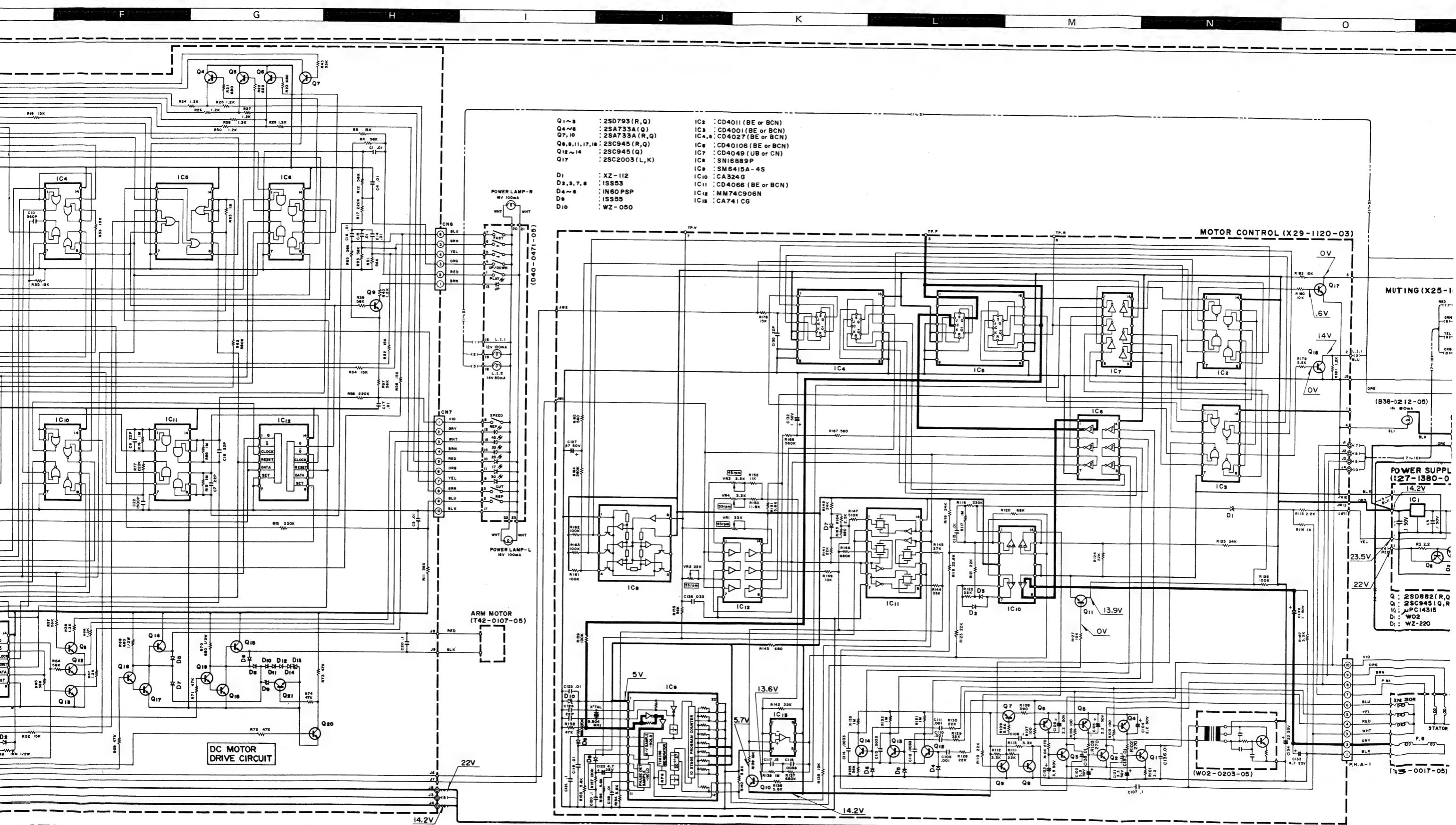
Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.



FULL AUTOMATIC QUARTZ PLL DIRECT DRIVE TURNTABLE



HTZ PLL DIRECT DRIVE TURNTABLE

KD-850



SPECIFICATIONS

MOTOR & TURNTABLE	
Drive System	Quartz PLL direct drive system
Motor	20 pole, 30 slot brushless DC servo motor (Starting torque 1.5 kg·cm)
Turntable Platter	33 cm (13inch) diameter, aluminum alloy die-cast Weight: 2.6 kg (5.7lbs.) Moment of inertia: 550 g·cm ²
Speeds	2 speeds, 33 1/3 and 45 rpm.
Wow & Flutter	Less than 0.022% (WRMS) Less than ±0.030% (DIN)
Signal to Noise Ratio	More than 62dB
Rumble	DIN weighted better than -83dB DIN unweighted better than -55dB
Load Fluctuation	0% (within 120g of tracking force)
Transient Load Fluctuation	Less than 0.0003% (at 33-1/3 rpm, 400Hz 20g·cm load) Less than 0.00015% (at 33-1/3 rpm, 1,000Hz 20g·cm load)
Starting Time	Within 1.8 sec.
Platter Speed Deviation	Less than 0.002%
Time Drift	Less than 0.0002%/h
Temperature Drift	Less than 0.00003%/°C

TONEARM	
Type	Static-balanced type, S-shaped pipe arm, EIA plug in connector
Effective Tonearm Length	245 mm (9-5/8 inch)
Overhang	15.5 mm (9/16 inch)
Tracking Error	+1.8 to -1.0 degree
Stylus Pressure	Variable Range: 0 to 3 grams (0.1 g step)
Usable Cartridge Weight	2.0 to 12.0 grams
Adjustable height Range	Within ±3mm (±1/8 inch)
Arm Base	Wedge-shaped chuck type

CARTRIDGE	Only military's model is equipped with the DM-11 cartridge.)
furnished Cartridge DM-11 (VM type)
stylus N-11 with 0.5 mil diamond
frequency Response 20Hz to 20,000Hz
Output Voltage 3.5mV (1,000Hz, 5cm/sec.)
Optimum Tracking Force 2.0 ± 0.3 grams
load Impedance 50 kilohms
Chank Separation Better than 27dB (1,000Hz)

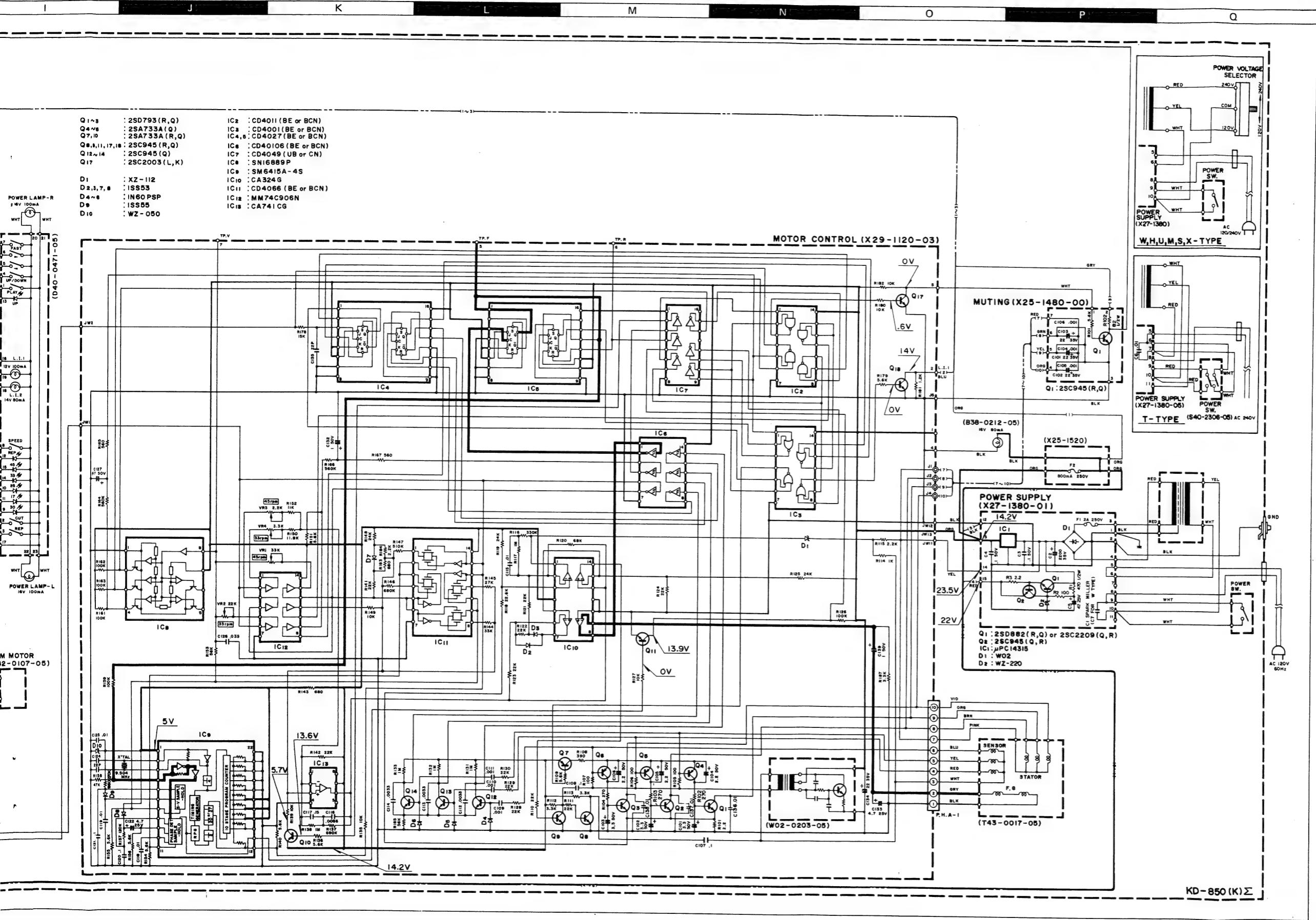
ADDITIONAL FEATURES: Full electronic controlled fully-automatic tonearm system (Automatic lead-in/return/cut/repeat) Automatic disc size selector Free-selection tonearm operating system (Forward/reverse) Oil damped cueing device Illuminated quartz-look indicator LED speed indicators Electronic-controlled brake Stylist height adjuster Wedge-shaped chuck type arm base Anti-skating device Low capacitance phono cables Stylist pressure direct readout counter Adjustable height insulators Acrylic dust cover (weight: 1.2 kg) Headshell stand

ISCELLANEOUS
Power Requirement AC 120V, 60Hz:
 U.S.A. and Canada models
 AC 240V, 50Hz:
 U.K. model
 AC 120V/220V (switchable),
 50Hz/60Hz: European and
 Military models
 AC 120V/240V (switchable),
 50Hz/60Hz: Other

Power Consumption	35.0 watts
Dimensions	W 491 mm (19-5/16")
	H 176 mm (6-15/16")
	D 404 mm (15-7/8")

SUPPLIED ACCESSORIES: 45 rpm. adaptor
Overhang gauge
Screw driver
Ground wire

CABINET
material Particle board laminated with simulated wood grain veneer and an Anti-Resonance Compressive Base (ARCB) are combined in the construction of the Cabinet.



DC voltages are measured when the DD motor is OFF.

PARTS LIST

Ref. No.	Parts No.	Description	Re-marks
参照番号	部品番号	部品名 / 規格	備考
UNIT (KD-850)			
1 1A		OPERATION PANEL ASSY	
2 1A		OPERATION BACK BOARD	
3 1A		SWITCH ROD (A) X4	
4 1A		SWITCH ROD (B) X4	
5 1A		SWITCH ROD STOPPER X8	
6 1A		ESCUOTHEON (L)	
7 1A		ESCUOTHEON (R)	
8 3A		LAMP FIXTURE (R)	
9 2A		LAMP FIXTURE (L)	
10 3A		PC BOARD	
11 2A		MOUNTING HARDWARE (A)	
12 2A		MOUNTING HARDWARE (B)	
13 2B		TURNTABLE CASE	
14 1B		SELECTOR PH-TR CASE	
15 2B		AUDIO CORD HOLDER	
16 2B		REAR PANEL	
17 2A		MOUNTING HARDWARE	
18 2A		HOLDER	
19 2A		GND PLATE	
20 2B		WEIGHT	
21 2B		MOUNTING HARDWARE	
22 2B	A03-0562-12	TURNTABLE CASE ASSY	*T
22 2B	A03-0564-12	TURNTABLE CASE ASSY	*K
22 2B	A03-0564-12	TURNTABLE CASE ASSY	MS
22 2B	A03-0564-12	TURNTABLE CASE ASSY	WX
22 2B	A03-0564-12	TURNTABLE CASE ASSY	UP
22 2B	A03-0564-12	TURNTABLE CASE ASSY	
22 2B	A03-0564-12	TURNTABLE CASE ASSY	
22 2B	A03-0564-12	TURNTABLE CASE ASSY	
22 2B	A03-0564-12	TURNTABLE CASE ASSY	
22 2B	A03-0564-12	TURNTABLE CASE ASSY	
23 3A	A40-0539-12	BOTTOM PLATE	
24 1B	A53-0213-12	DUST COVER	
25 1B	A53-0220-02	DUST COVER ASSY	
-	B23-0004-04	OVERHANG GAUGE	
-	B46-0055-20	WARRANTY CARD	P
-	B46-0060-00	WARRANTY CARD	T
-	B46-0061-20	WARRANTY CARD	K
-	B46-0062-20	WARRANTY CARD	UH
-	B46-0063-00	WARRANTY CARD	U
-	B46-0064-10	WARRANTY CARD	X
-	B50-2355-00	INSTRUCTION MANUAL	*K
-	B50-2355-00	INSTRUCTION MANUAL	SW
-	B50-2355-00	INSTRUCTION MANUAL	UH
-	B50-2356-00	INSTRUCTION MANUAL	*M
-	B50-2356-00	INSTRUCTION MANUAL	XP
-	B50-2357-00	INSTRUCTION MANUAL	*T
-	B59-0018-00	SERVICE STATIONS LIST	U
26 2A	B07-0538-14	ESCUOTHEON(POWER SWITCH)	
27 1B	B07-0589-01	TURNTABLE RING	*
28 1A	B08-2201-08	LED INDICATOR WINDOW X7	*
29 1A	B08-3205-08	LOCK INDICATOR WINDOW	*
30 1A	B09-0213-08	SWITCH CAP (A) X4	*
31 1A	B09-0214-08	SWITCH CAP (B) X4	*
32 1A	B10-0514-08	OPERATION PANEL(ACRYL)	*
33 1A	B19-0505-04	PRISM X2	*
34 1A	B19-0506-08	OPERATION INSIDE PANEL	*
35 2A	B19-0507-08	LENS X2	*
36 2A	B30-0169-05	LED X7	
37 1A	B30-0717-05	LAMP 12V 100MA	
38 2A	B30-0720-05	LAMP 16V 100MA X2	*
39 1A	B30-0721-05	LAMP 14V 80MA	*
40B 2B	B30-0723-05	LAMP (RESEARCH LIGHT)	*
40A 2B	B38-0212-05	RESEARCH LIGHT ASSY	*

Ref. No.	Parts No.	Description	Re-marks
参照番号	部品番号	部品名 / 規格	備考
UNIT (KD-850)			
41 1B	D02-0029-05	TURNTABLE PLATTER	*
42A 2B	D32-0080-24	SWITCH STOPPER	MS
42A 2B	D32-0080-24	SWITCH STOPPER	WX
42A 2B	D32-0080-24	SWITCH STOPPER	UP
42A 2B	D32-0080-24	SWITCH STOPPER	H
-	E23-0046-04	TERMINAL X2	
42B 2B	E30-0181-05	POWER CORD	KP
42B 2B	E30-0459-05	POWER CORD	WH
42B 2B	E30-0587-05	POWER CORD	ST
42B 2B	E30-1317-15	POWER CORD	MU
42B 2B	E30-1341-05	POWER CORD	X
43 1B	E30-1301-05	GND CORD	
44 2B	E30-1339-05	AUDIO CORD	*M
44 2B	E30-1339-05	AUDIO CORD	ST
44 2B	E30-1339-05	AUDIO CORD	WX
44 2B	E30-1339-05	AUDIO CORD	UP
44 2B	F19-0504-04	HOLE CAP	
F1	F05-2023-05	FUSE 2 A	MS
F1	F05-2023-05	FUSE 2 A	XU
F1	F05-2027-05	FUSE 2 A	KP
F1	F05-2029-05	FUSE 2 A	TW
F1	F05-2029-05	FUSE 2 A	H
F2	F05-8012-05	FUSE 800MA	TW
F2	F05-8012-05	FUSE 800MA	H
F2	F05-8015-05	FUSE 800MA	MS
F2	F05-8015-05	FUSE 800MA	XU
H	F2	F05-8019-05	
F1	F05-2029-05	FUSE 2 A	
F2	F05-8012-05	FUSE 800MA	
F2	F05-8015-05	FUSE 800MA	
F2	F05-8015-05	FUSE 800MA	
F2	F05-8019-05	FUSE 800MA	
G01-0737-08		COILED SPRING X8	*
G13-0416-04		CUSHION (TRANSFORMER) X2	
G16-0332-12		RUBBER MAT	*M
G16-0332-12		RUBBER MAT	ST
G16-0332-12		RUBBER MAT	WX
G16-0332-12		RUBBER MAT	H
G16-0332-12		RUBBER MAT	UP
G16-0333-12		RUBBER MAT	K
G16-0332-12		CARTON BOX	*K
H01-2361-04		CARTON BOX	
H01-2361-04		CARTON BOX	U
H10-2243-02		POLYSTYRENE FIXTURE (C)	*
H10-2256-02		POLYSTYRENE FIXTURE (A)	*
H10-2257-02		POLYSTYRENE FIXTURE (B)	*
H12-0340-04		PACKING FIXTURE	
H12-0342-04		PACKING FIXTURE	
H12-0357-02		PACKING FIXTURE (A)	*
H12-0358-04		PACKING FIXTURE (B)	*
H20-1102-04		COVER	KS
H20-1102-04		COVER	TW
H20-1102-04		COVER	XU
H20-1102-04		COVER	PH
H21-0604-04		Sheet	
H25-0029-04		BAG	
H25-0078-04		BAG	
H25-0611-04		BAG	
H39-0015-05		HOOK W100	M
J19-0306-05		LEAD HOLDER	
J61-0050-15		WIRE BAND NK4N	
J61-0056-05		WIRE BAND	
J61-0059-05		WIRE BAND NK10N	
J61-0301-05		WIRE BAND NK6N	

Ref. No.	Parts No.	Description	Re-marks
参照番号	部品番号	部品名 / 規格	備考
UNIT (KD-850)			
49 3A	J02-0330-15	VIBRATION ISOLATOR X4	
50 2A	J09-0303-24	SHELL STAND	
51 2A	J19-1931-08	LED HOLDER X7	*
52 2A	J21-2302-05	HINGE MOUNTING HARDWARE	
53 2B	J41-0017-05	BUSHING (POWER CORD)	ST
53 2B	J41-0017-05	BUSHING (POWER CORD)	WX
53 2B	J41-0017-05	BUSHING (POWER CORD)	H
53 2B	J41-0017-05	BUSHING (POWER CORD)	KM
53 2B	J41-0017-05	BUSHING (POWER CORD)	UP
53 2B	J41-0017-05	BUSHING (AUDIO CORD)	*
55 1B	J50-0314-05	HINGE(1) X2	
56 1B	J50-0315-04	HINGE(2) X2	
57 2B	J92-0053-15	HEAD SHELL ASSY	
58 2A	K29-0689-04	KNOB (POWER SWITCH)	
59 2A	L01-6271-05	POWER TRANSFORMER	*K
59 2A	L01-6271-05	POWER TRANSFORMER	P
59 2A	L01-6274-05	POWER TRANSFORMER	*M
59 2A	L01-6274-05	POWER TRANSFORMER	ST
59 2A	L01-6274-05	POWER TRANSFORMER	WX
60 2B	N08-0128-35	DRESSED SCREW	
61 2A	N09-0551-05	SCREW M3X14(TAP)	
62 1A	N09-0557-05	SCREW M4X16(TAP)	
63 2B	N09-0812-05	SCREW M3X12(TAP)	
64 3A	N09-0841-04	SCREW M3X20(BR-TAP)	
65 2A	N09-0848-05	SCREW M3X12(BR-TAP)	
66 2A	N09-0849-05	SCREW M3X15(TP-TAP)	
67 2B	N09-0850-04	SCREW L-10 X2	
68 2B	N09-0851-04	SCREW L-15 X2	
69 2B	N09-0852-04	SCREW L-20 X2	
70 2A	N14-0409-05	T NUT X4	
71 2B	N14-0412-04	NUT(2.6)	
72 2B	N14-00		

PARTS LIST

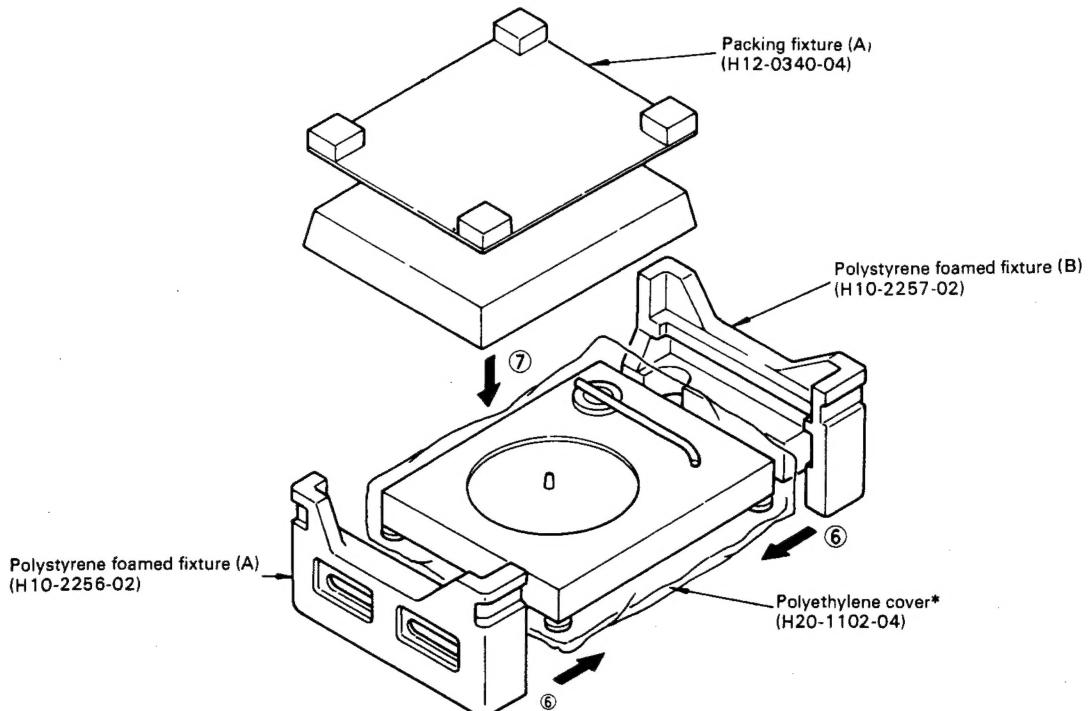
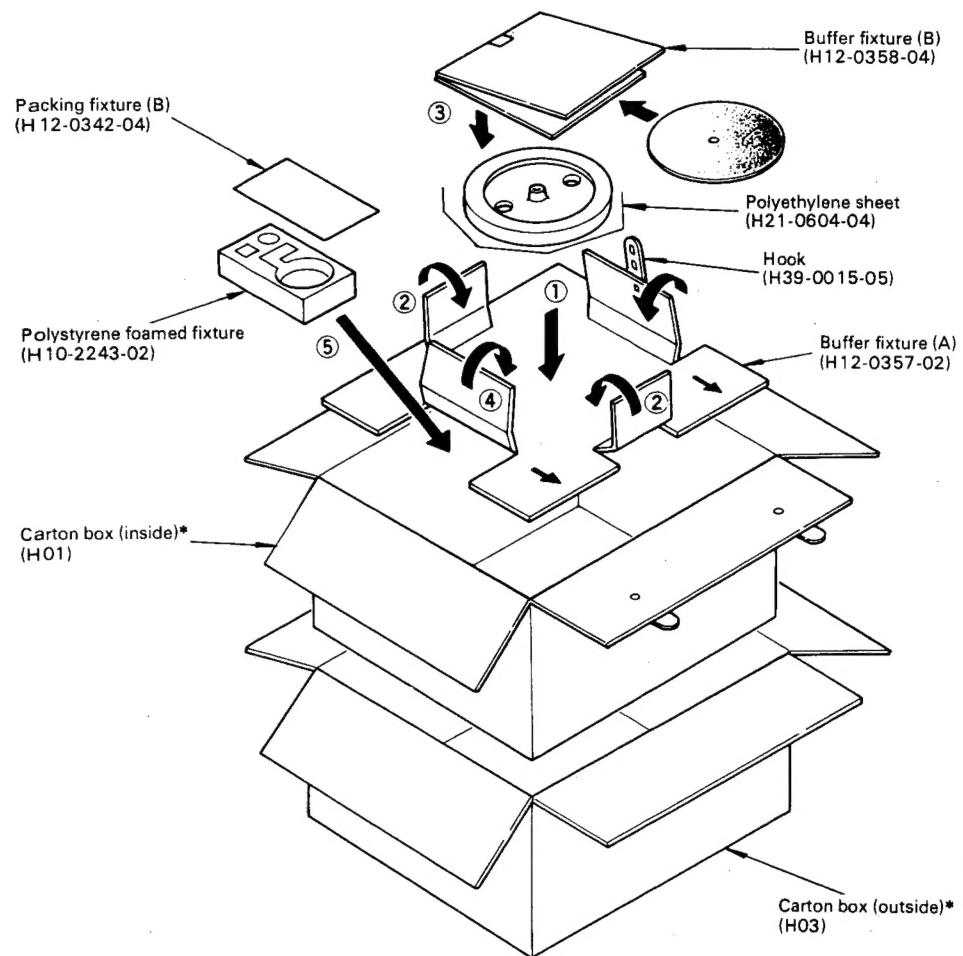
PARTS LIST

Description 部品名/規格	Ref. No. 参照番号	Parts No. 部品番号	Description 部品名/規格	Re- marks 備考
FUSE PCB ASSY		XP		
FUSE PCB ASSY		*T		
FUSE PCB ASSY		WH		
POWER SUPPLY PCB ASSY		*K		
POWER SUPPLY PCB ASSY		*P		
POWER SUPPLY PCB ASSY		*W		
POWER SUPPLY PCB ASSY		H		
POWER SUPPLY PCB ASSY		*M		
POWER SUPPLY PCB ASSY		SX		
POWER SUPPLY PCB ASSY		U		
POWER SUPPLY PCB ASSY		*T		
MOTOR CONTROL PCB ASSY		*		
MECHANISM CONTROL PCB		*		
X25-1480-00)				
LECTRO 22UF	35WV			
L-PROOF RD82	J 3D			
SC945(Q,R)				
X25-1490-01)				
LR121 X6	*			
PS-605 X3	*			
X25-1510-01)				
TERMINAL X2				
TERMINAL				
X25-1520)				
TERMINAL X3				
USE HOLDER X2				
PS-605 X3				
LY (X27-1380)				
ERAMIC 0.01UF P	T			
F 0.047UF K	P			
ERAMIC 0.01UF K	K			
F 0.047UF 1000V	M			
LECTRO 2200UF	35WV			
ERAMIC 0.1UF M				
LECTRO 47UF 25WV				
ERAMIC 0.01UF P	T			
ERAMIC 0.01UF P	W			
TERMINAL X11				
TERMINAL X2				
USE HOLDER				
L-PROOF RD470	J 2H			
02				
Z-220				
PC14315	*			
SC2209(Q,R)	*			
SD882(Q,R)				
SC945(Q,R)	W			
DL (X29-1120-03)				
LECTRO 3.3UF 50WV				
LECTRO 2.2UF 50WV				
YLAR 0.1UF J				
YLAR 0.001UF K				
YLAR 0.0033UF J				
YLAR 0.01UF J				
YLAR 0.0056UF J				

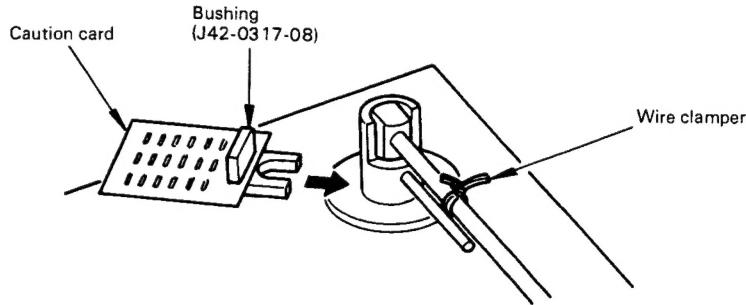
Description 部品名/規格	Ref. No. 参照番号	Parts No. 部品番号	Description 部品名/規格	Re- marks 備考
C117	C46-1715-46	MYLAR 0.15UF K		
C118,119	C91-0320-05	FILM 0.1UF 50WV		
C120,121	C91-0321-05	FILM 0.01UF 50WV		
C122	C24-1447-51	ELECTRO 4.7UF 25WV		
C123,124	C59-1722-05	CERAMIC 22PF J		
C125	C53-1710-37	CERAMIC 0.01UF M		
C126	C46-1733-35	MYLAR 0.033UF J		
C127	C24-1747-49	ELECTRO 0.47UF 50WV		
C132	C25-1710-57	ELECTRO 1UF 50WV		
C133	C24-1447-51	ELECTRO 4.7UF 25WV		
C134	C25-6522-61	ELECTRO 22UF 35WV		
C135	C71-1722-06	CERAMIC 22PF K		
C136-138	C45-1710-35	MYLAR 0.01UF M		
C139	C25-1710-57	ELECTRO 1UF 50WV		
-	E23-0047-04	TERMINAL X6		
-	L77-0569-05	CRYSTAL RESONATOR		
-	R92-0508-05	FUSE=RESISTOR		
R101	R47-5522-95	FL-PROOF RS2,2 J 3D		
R118	R48-2226-24	RN 22.6K G 2E		
R119	R48-6224-34	RN 24K G 2E		
R124	R48-2220-24	RN 22K G 2E		
R125	R48-6224-34	RN 24K G 2E		
R141,142	R48-2220-24	RN 22K G 2E		
R148	R48-6224-34	RN 24K G 2E		
R150	R48-2118-23	RN 11.8K F 2E		
R152	R48-2110-23	RN 11K F 2E		
R157	R48-6212-44	RN 120K G 2E		
R160	R48-2270-34	RN 270K G 2E		
R181	R43-1212-25	FL-PROOF RD1,2K J 2E		
VR1	R12-3050-05	TRIMMING POT, 33K		
VR2	R12-3051-05	TRIMMING POT, 22K		
VR3	R12-1043-05	TRIMMING POT, 2.2K		
VR4	R12-1041-05	TRIMMING POT, 3.3K		
D1	V11-4103-30	X2-112		
D2	V11-1200-80	1SS53		
D4	V11-0457-05	1N60PSP		
D7	V11-1200-80	1SS53		
D9	V11-1200-40	1SS55		
D10	V11-4102-10	WZ-050		
IC2	V30-0304-10	CD40118E		
IC3	V30-0303-10	CD40118CN		
IC4	V30-0305-10	CD40018E		
IC5	V30-0309-10	CD40106BE		
IC6	V30-0306-10	CD40106BCN		
IC7	V30-0306-10	CD4049UBE		
IC8	V30-0263-10	CD4049CN		
IC9	V30-0250-30	SN16889P		
IC10	V30-0256-10	SH6415A-4S		
IC11	V30-0307-10	CA324G		
IC12	V30-0308-10	CD4066BCN		
IC13	V30-0302-10	MM74C906N		
Q1	V04-0793-10	CA741CG		
Q4	V01-0733-50	2SD793 (R,Q)		
Q7	V01-0733-30	2SA733A (R,Q)		
Q8	V03-0270-05	2SC945 (Q,R)		

Description 部品名/規格	Ref. No. 参照番号	Parts No. 部品番号	Description 部品名/規格	Re- marks 備考
Q10	V01-0733-30	2SA733A (R,Q)		
Q11	V03-0270-05	2SC945 (Q,R)		
Q12	V03-0293-05	2SC945 (Q)		
Q17	V03-2003-30	2SC2003 (L,K)		
Q18	V03-0270-05	2SC945 (Q,R)		
-	W02-0203-05	OSCILLATION BLOCK		
MECHANISM CONTROL (X29-1160-00)				
C1	V91-0333-05	CERAMIC 0.01UF M		
C5	C52-1756-16	CERAMIC 560PF K		
C6	C71-1722-05	CERAMIC 22PF J		
C8	C52-1756-16	CERAMIC 560PF K		
C12	C45-1710-45	MYLAR 0.1UF J		
C13	C45-1727-45	MYLAR 0.27UF J		
C14	V91-0333-05	CERAMIC 0.01UF M		
C18	C71-1722-05	CERAMIC 22PF J		
C19	C24-1710-51	ELECTRO 1UF 50WV		
C20	C90-0270-05	CERAMIC 0.1UF K		
C22	C42-1715-26	CERAMIC 0.0015UF K		
C24	V91-0333-05	CERAMIC 0.022UF Z		
C27	C24-1747-41	ELECTRO 0.47UF 50WV		
-	E23-0046-04	TERMINAL X4		
R68	R43-1368-15	FL-PROOF RD680 J 2H		
R70	R43-1368-15	FL-PROOF RD680 J 2H		
D1	V11-1200-80	1SS53		
D4	V11-0273-05	1S2076A		
D5	V11-0295-05	W06B		
D7	V11-1200-80	1SS53		
D9	V11-4103-60	XZ-051		
D10	V11-1200-80	1SS53		
D13	V11-4176-76	XZ-057		
IC1	V30-0369-10	CD4071BE		
IC2	V30-0303-10	CD40018E		
IC4	V30-0369-10	CD4071BE		
IC5	V30-0362-10	CD4075BE		
IC6	V30-0366-10	CD4075BCN		
IC7	V30-0306-10	CD4049UBE		
IC8	V30-0263-10	CD4081BE		
IC9	V30-0250-30	CD4081BCN		
IC10	V30-0256-10	CD409UBE		
IC11	V30-0307-10	CD4049CN		
IC12	V30-0308-10	MC14081B		
IC13	V30-0302-10	4049BPC		
Q1	V04-0793-10	2SD793 (R,Q)		
Q4	V01-0733-50	2SA733A (Q)		
Q7	V01-0733-30	2SA733A (R,Q)		

PACKING



* Refer to Part List

PACKING

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